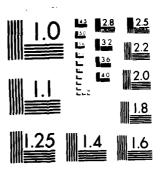
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Final Generic Environmental Impact Statement for 5. TYPE OF REPORT & PERIOD COVERED Exploration and Production of Hydrocarbon Resources Final in Coastal Alabama and Mississippi 6. PERFORMING ORG. REPORT NUMBER CONTRACT OR GRANT NUMBER(*) 7. AUTHOR(a) U. S. Army Corps of Engineers, Mobile District 9. PERFORMING ORGANIZATION NAME AND ADDRESS 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS Department of the Army Mobile District, Corps of Engineers P. O. Box 2288, Mobile, AL 36628-0001 11. CONTROLLING OFFICE NAME AND ADDRESS 12. REPORT DATE November 1984 Same as No. 9 NUMBER OF PAGES 14. MONITORING AGENCY NAME & ADDRESS(II different from Controlling Office) 15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE 16. DISTRIBUTION STATEMENT (of this Report) Approved for Public Release; Distribution Unlimited 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, If different from Report) 18. SUPPLEMENTARY NOTES 19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Generic EIS Corps of Engineers Permits Hydrocarbon Permits Alabama, Mississippi 20. ABSTRACT (Continue on reverse side if recessary and identify by block number) An analysis has been undertaken of the physical biological and socioeconomic effects of hydrocarbon exploration and production activities in coastal Alabama and Mississippi and adjacent Federal waters of the Gulf of Mexico. The analysis consists of two parts: effects and generic unit actions, and cumulative effects of postulated hydrocarbon-related activities in the region over the next 30 years. Four subregions are considered in the analysis: the

___rested and seasonally-flooded Mobile-Tensaw River Delta, the shallow coastal

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estuaries of Mobile Bay and Mississippi Sound, and the Alabama and Mississippi state waters of the Gulf of Mexico.

Beneficial effects of hydrocarbon exploration and production activities would include some increase in regional employment and income, the receipt of bonus payments for leases, severance taxes and royalties by the states of Alabama and Mississippi, receipt of lease payments and royalties by private landowners, and an increase in the domestic production of natural gas, sulfur and oil. Other beneficial effects would be the creation of oyster habitat from shell pads placed at drilling locations in Mobile Bay and Mississippi Sound and space for attachment of fouling organisms on drilling/production platforms at all well sites.

The main short-term adverse environmental effects would be turbidity resulting from well site and pipeline construction activities, and the temporary loss of habitat and biological productivity during pipeline construction and during the drilling period at well sites that are eventually abandoned as dry holes.

Long-term adverse environmental effects include the reduction or loss of biological productivity and the alteration of habitat value at producing well sites and along wetland pipeline corridors, which would continue for many years until a well field is abandoned. The operation of drilling rigs, offshore production facilities, and onshore gas and oil cleaning and processing facilities would contribute to regional air pollutant emissions until the regional hydrocarbon resource is depleted. Loss of well control or rupture of a pipeline releasing oil could have an extensive effect on regional ecosystems and economies, depending on the size of the spill. Loss of well control or rupture of a pipeline releasing natural gas containing hydrogen sulfide could endanger human health and be harmful to plants and animals near the point of release.

EXECUTIVE SUMMARY

EXPLORATION AND PRODUCTION OF HYDROCARBON RESOURCES IN COASTAL ALABAMA AND MISSISSIPPI

FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT

LEAD AGENCY:

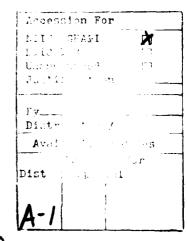
U.S. ARMY CORPS OF ENGINEERS MOBILE DISTRICT

COOPERATING AGENCIES:

U.S. ENVIRONMENTAL PROTECTION AGENCY
U.S. FISH AND WILDLIFE SERVICE
NATIONAL MARINE FISHERIES SERVICE
ALABAMA DEPARTMENT OF ENVIRONMENTAL
MANAGEMENT

ALABAMA OIL AND GAS BOARD
MISSISSIPPI DEPARTMENT OF
NATURAL RESOURCES
MISSISSIPPI DEPARTMENT OF
WILDLIFE CONSERVATION,
BUREAU OF MARINE RESOURCES
MISSISSIPPI OIL AND GAS BOARD

NOVEMBER 1984



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FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT

EXPLORATION AND PRODUCTION OF HYDROCARBON RESOURCES IN COASTAL ALABAMA AND MISSISSIPPI

The responsible lead agency is the U.S. Army Corps of Engineers, Mobile District, which has jurisdiction over permit applications for oil and gas activities in navigable waters and adjacent wetlands under the authority of Section 10 of the River and Harbor Act of 1899 and Section 404 of the Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977.

Cooperating federal and state agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Geological Survey, National Marine Fisheries Service, Alabama Department of Environmental Management, Alabama Oil and Gas Board, Mississippi Department of Natural Resources, Mississippi Department of Wildlife Conservation, and Mississippi Oil and Gas Board.

Abstract: An analysis has been undertaken of the physical biological and socioeconomic effects of hydrocarbon exploration and production activities in coastal Alabama and Mississippi and adjacent federal waters of the Gult of Mexico. The analysis consists of two parts: effects of generic unit actions, and cumulative effects of postulated hydrocarbon-related activities in the region over the next 30 years. Four subregions are considered in the analysis: the forested and seasonally-flooded Mobile-Tensaw River Delta, the shallow coastal estuaries of Mobile Bay and Mississippi Sound, and the Alabama and Mississippi state waters of the Gulf of Mexico.

Beneficial effects of hydrocarbon exploration and production activities would include some increase in regional employment and income, the receipt of bonus payments for leases, severance taxes and royalties by the states of Alabama and Mississippi, receipt of lease payments and royalties by private landowners, and an increase in the domestic production of natural gas, sulfur and oil. Other beneficial effects would be the creation of oyster habitat from shell pads placed at drilling locations in Mobile Bay and Mississippi Sound and space for attachment of fouling organisms on drilling/production platforms at all well sites.

The main short-term adverse environmental effects would be turbidity resulting from well site and pipeline construction activities, and the temporary loss of habitat and biological productivity during pipeline construction and during the drilling period at well sites that are eventually abandoned as dry holes.

Long-term adverse environmental effects include the reduction or loss of biological productivity and the alteration of habitat value at producing well sites and along wetland pipeline corridors, which would continue for many years until a well field is abandoned. The operation of drilling rigs, offshore production facilities, and onshore gas and oil cleaning and processing facilities would contribute to regional air pollutant emissions until the regional hydrocarbon resource is depleted. Loss of well control or rupture of a pipeline releasing oil could have an extensive effect on regional ecosystems and economies, depending on the size of the spill. Loss of well control or rupture of a pipeline releasing natural gas containing hydrogen sulfide could endanger human health and be harmful to plants and animals near the point of release.

Additional information on this Final Generic Environmental impact Statement may be obtained from:

Mr. Clay Carter
SANOP-S
Mobile District
U.S. Army Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36628
Commercial (205) 690-2658
FTS 537-2658

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CHAPTER 1

INTRODUCTION

- invironment: Implied Statement (delta): Exploration and Production of the processing the Constant of the Exploration and Production of the processing the Constant of the Area of the Area of the Constant of the
- 1.2 Regional resource development scenarios were developed during the course of the EIS process. High, medium and low estimates of the potential total recoverable hydrocarbons have been made for the area along with assumptions on the timing and intensity of resource production over the next 30 years.
- 1.3 The development scenarios coupled with the unit actions have been used to determine the potential comulative environmental effects that could result in the region over time. Summary tables of the potential effects described in the GP's follow the unit action material. Mitigating measures are proposed in Chapter 10 of the GEIs to alleviate potential adverse consequences; these proposals are summarized following summary tables of the potential cumulative effects of hydrocarbon activity. Finally, a reproduction of the GEIS Chapter 13 "Interagency Perspective and Recommendations" is given. The quapter represents a cooperative effort on the part of all participating federal and state agencies to evaluate the potential impacts and plan for them in advance.

CHAPTER Z

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BACKOR, ND. WITHORSTY AND THE INTEST, PURPOSE AND STREET

ieral, ped continuo past several years, considerable Interest has ieral, ped continuo pocential for the recovery of commercial quantities of oil and material das from geological torbations between the consists, rathers of Alabama and Mississippi. Leasing las taken plane in our state waters on the contiguous tederal waters of the doll or baxico, mostly in Alabama waters and vicinity. The potential for and gas cormations underlying the Mobile given belta in Mobile tounty, Alabama has also resulted in interest in exploration of this welland area.

that may occur in the region, the Mobile District of the U.S. Army corps of Engineers, and the U.S. Environmental Protection Agency have prepared this locument with assistance from consultants. Other cooperating agencies (while 2-1) have contributed information as needed during the preparation of the document through review and comment on the preliminary draft. This Generic Environmental Impact Statement has been prepared to evaluate the environmental issues associated with the anticipated hydrocarbon exploration and production from the lands underlying the Mobile Delta, Mobile Bay, Mississippi Sound and adjacent state waters of the Gulf of Mexico. The location of these areas are shown in Figure 2-1. The study region encompasses these areas in addition to the counties of Southern Alabama and Mississippi.

HISTORY OF OIL AND GAS RELATED ACTIVITIES IN THE STUDY AREA

- Exploratory and production drilling has occurred around the study area since 1950 in Alabama and 1950 in Mississippi, with many fields producing commercial quantities of oil and gas (Figure 2-2). Recently, several fields were established in southern Baldwin County and are producing gas from relatively shallow formations. Although no fields are yet established in southern Mobile County, several wells have been drilled successfully to these same shallow formations, and exploratory drilling continues.
- 2.4 Within the wetland and coastal waters under consideration in the study (Figure 2-1), drilling has occurred in the Mobile Delta and in Mobile Bay. In the Delta region, early production centered on moderate depth formations on the northern and eastern edges of the Delta (the South Carlton and Teasaw Take fields). Within the Delta, four exploratory efforts between 1963 and 1979 resulted in dry holes. In 1982, oil and gas were discovered in a deep formation in the Delta east of Mount Vernon

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FIDERAL AND STATE AGENCIES COOPERATING IN THE FREPARATION OF THE GENERIC ENVIRONMENTAL IMPACT STATEMENT

U.S. Army Corps of Engineers
U.S. Environmental Protection Agency, Region IV
U.S. Dish and Wildlite Service
U.S. Geological Survey
National Marine Fisheries Service
Alabama Department of Environmental Management
Alabama Oil and Gas Board
Mississippi Department of Natural Resource:
Mississippi Department of Wildlite Conservation
Mississippi Oil and Gas Board

2-3

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FIGURE 3-6 LOCATION OF CLASS I AND CLASS II DISPOSAL WELLS

1

FIGURE 3-5 AQUIFERS OF COASTAL ALABAMA AND MISSISSIPPI

3-- ' ,

	SYSTEM	SERI ES	GEOLOGIC UNIT		AND GAS G FORMATIONS
4	\$ 1.8	JE	UNIT	ALABAMA	MISSISSIPPI
	GUATERNARY	HOLOCENE PLEISTOCENE			
		PLIOCENE	JAG-1748841475		
20K		MIOCENE	of Marcons	G	
CENOZOK	TERTIARY			G	
	1	OLIGOCENE	MB 1118451-A160		
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	:		SAGAME HT CHAPLE 4		

0- 011

G- Gas

GC - Gas-Condensate

FIGURE 3-4

GENERALIZED STRATIGRAPHIC COLUMN OF OIL AND GAS
PRODUCING AREAS OF COASTAL ALABAMA AND MISSISSIPPI



through 7-21 at the end of this chapter. For 1. only a tio. malyses, separate councils to table and liver it geograph is exploration, willing, production, abades well as the tools ills, however well control and additions. These are decires at some for for the Moble Delta (lables 2-2 through thoo, Mobile bayout Mississippi Sound (lables 2-7 through this, and for associated activities occurring on upland areas adjacent to the study region (Tables 2-17 through 2-19). The cumulative environmental effects associated with the resource development scenarios are summarized in Tables 2-20 and 2-21.

3.19 Impacts on surface water resources, in terms of the development activity not violating regulatory standards, are not learly quantifiable. Even with individual permit applications, the impacts on hydrology and water quality would vary based on storm events and flows of water from upstream areas. Hence, the assessment of impacts on water resources and other portions of the environment is as quantitative as possible recognizing that uncertainties are evident.

Assumptions on Which All Analyses Are Based

- 3.7 The following are assumptions on which all analyses have been based:
 - o No discharge will be allowed of drilling fluids, cuttings, formation waters, contaminated wastewaters or contaminated rainwater runoff into waters of the study region.
 - o Discharge will be allowed of uncontaminated rainwater, uncontaminated washwater, uncontaminated fire pump test water and non-contact cooling water to waters of the study region.
 - All canals and slips for use of an inland drilling barge will be restored to preproject contours upon abandonment.
 - All dredged access channels to well sites will be backfilled upon abandonment.
 - All pipeline trenches will be backfilled to preproject contours.
 - All current local, state and federal regulations will be followed.
 - o The number of surface structures in wetland and aquatic areas will be minimized, and some joint ventures will be used for pipelines.

The first 5 assumptions are current policy of state agencies and the Mobile District. Should these policies change in the future, the Generic Environmental Impact Statement may be supplemented and the findings and conclusions changed if necessary.

COMPARISON OF ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

3.8 The environmental loadings and generic environmental effects of unit actions in the Mobile Delta, Mobile Bay, Mississippi Sound, state waters of the Gulf of Mexico and upland areas adjacent to the study region are discussed in Chapters 4 through 7 of the GEIS. The environmental effects of the three postulated resource development scenarios are discussed in Chapter 8 of the GEIS. Comparisons of the effects associated with the alternatives considered are given in Chapter 2 of the GEIS and in Tables 2-2

TABLE 3-1

UNIT ACTIONS CONSIDERED IN CHAPTERS 4 THROUGH 7 OF THE GEIS

Mobile Delta	Mobile Bay And Mississippi Sound	State Waters Of The Gulf Of Mexico	Activities Occurring On Uplands
	GEOPHYS	GEOPHYSICAL EXPLORATION PHASE	
Swamp buggies Surveys from Uplands	Seismic survey boats Marsh buggles in sait marshes	Seissic survey boats	Surveys from uplands
		-DEILLING PHASE	
Inland drilling barge Canal and slip River bank slip River channel location Fixed drilling platform Canal access Trestle road access River bank location Board road and ring levee Directional drilling	Inland drilling barge Jackup drilling rig Submersible drilling rig Fixed drilling platform Directional drilling from uplands	Jackup drilling rig Submeraible drilling rig Fixed drilling platform Directional drilling from uplands	Upland well site
from uplands		PRODUCTION PHASE-	
Well completion	Well completion Platform installation	Well completion Production platform	Well completion Gathering system construction
construction	Gathering system	installation	Treatment facility construction
Normal operations of	Construction	Cathering system construction Normal operations of wells	Normal operations of gathering system
Wells and pipelines Well workover	wells and otherthes	and pipelines	Normal operations of treatment
Enhanced recovery	Well workover	Well workover	facilities
	Enhanced recovery	Enhanced recovery	Enhanced recovery
			inansport of resource to intermediate market
			Services bases
	1987	-ABANDONHENT PHASE-	
Well afte	Well site	Well site	Upland well site
Pipelines	Pipelines	Pipelines	Pipelines Treatment facilities
			Service bases

- o The mostly forested and seasonally flooding Mobile Delta.
- The shallow protected coastal waters of Mobile Bay and Mississippi Sound.
- o The nearshore Gulf of Mexico waters.
- o The adjacent upland areas.

The unit actions considered are given in Table 3-1.

Regional Resource Development Scenarios

- The future environmental effects of oil and gas exploration and production activities in coastal Alabama and Mississippi will be a function of all the activities occurring together in the region at any time. In general, several activities will be occurring concurrently, such as drilling and production, and construction and operation activities. The amount and intensity of activity will be a function of the quantity of hydrocarbon resource that can be recovered, the timing of the leasing of public waters and private lands, lease exploration and development schedules established by the lease holders, and future factors affecting the hydrocarbon market.
- 3.5 The environmental analysis is based on an estimate of the recoverable hydrocarbon resource in the region, scenarios for development of these resources and the environmental loadings of the unit actions. The resource development scenarios establish upper and lower limits on the level of concurrent activities that could occur in each subregion over the next 30 years, based on certain assumptions about the timing of resource discovery and schedules of resource production. The development scenarios are not predictions of what will happen in the future. They merely establish limits within which future development is likely to occur. The resource development scenarios are given in Figures 8-1 through 8-6 (the figure numbers in the GEIS) at the end of this chapter.
- 3.6 The concurrent rescurce development activities by year are used to determine environmental alterations that could result from these activities. Several examples are habitat area disturbed over time, the effect of habitat disturbance on regional ecosystems, labor force required and the socioeconomic effect of these requirements, regional air and water quality, and environmental and safety considerations of accidents.

CHAPTER 3

SCHMARY OF THE EXISTING ENVIRONMENT, COMPARISON OF UNIT ACTION ALTERNATIVES, AND POTENTIAL CUMULATIVE ENVIRONMENTAL EFFECTS

SELECTED ASPECTS OF THE EXISTING ENVIRONMENT

3.1 The study area consists of four ecosystems; the mostly torested ileodplain or the Mobile-Tensaw River Delta characterized by seasonal flooding, the shallow river-dominated coastal estuary of Mobile Bay, the higher salinity shallow estuary of Mississippi Sound, and the nearshore coastal environment of the state-controlled-waters of the Gult of Mexico. To provide an overview of the physical, biological and socioeconomic characteristics of these four areas, selected maps from the Affected Environment Section (Chapter 3) of the GEIS are provided here. The figure numbers and page numbers are those for the figures in the GEIS.

ALTERNATIVES CONSIDERED

3.2 Alternatives considered in the generic environmental impact statement are those feasible methods, equipment and support systems that could be used for hydrocarbon exploration and production in the Mobile Delta, Mobile Bay, Mississippi Sound, State waters of the Gult of Mexico and adjacent upland areas. These are considered for each region for unit actions of the geophysical exploration, drilling, production and abandonment phases of resource development. Additionally, the cumulative environmental effects of producing three alternative total quantities of hydrocarbons over the next 30 years in the study region have been investigated.

Unit Action Alternatives

3.3 Unit actions based on various alternative methods, equipment and support requirements for the various activities within each hydrocarbon resource development phase have been identified. Four exploration and operating environments have been identified within the study region. A unit action is defined as a group of activities or sequence of events that occur together to complete a particular portion of a phase of hydrocarbon exploration and production. Some examples of unit actions are site preparation for a drilling alternative, well completion, gathering system construction, and gas treatment facility operation. The unit actions are analyzed (Chapters 4 through 7 of the GEIS) for their generic environmental loadings and effects within the study region:

THE GENERAL ENVIRONMENTAL AND A STATE OF THE GENERAL BOWLENGES AND A STATE OF THE GENERAL BOWLENGES.

general each of the period of time necessary to complete the general each measure impact statement process the District will continue to a cept and process permit applications for hydrocarbon exploration and production in the study area. Decisions on the applications will be based on the overall public interest review at that time do, will not be delayed solely because of the ongoing development of the environmental impact statement.

2.14 Fermit applications received by the District will continue to be processed on an individual basis. For each application, as is necessary, a public notice will be issued providing opportunity for the public to request a public nearing or to comment on the proposal; the District will prepare an environmental assessment of the proposal to determine it there are potentially significant environmental impacts that would require the preparation of a site-specific impact statement. The District will also send the proposal to the appropriate agencies for their review.

2.15 In the District Engineer determines that a project for which a permit has been requested has the potential for significant effects upon the quality of the human environment and it is believed that issuance of a permit may be warranted, then an environmental impact statement will be prepared to address that specific permit request. This impact statement may be a part of the ongoing generic environmental impact statement, a supplement to the generic environmental impact statement or a separate impact statement on its own merits. If no significant impacts are suspected, then the sitespecific request will continue to be processed based on the results of the environmental assessment.

INDUSTRY PURPOSE AND NEED FOR HYDROCARBON RESOURCE DEVELOPMENT ACTIVITIES

The oil and gas industry has obtained mineral leases in 2.10 the study area from the states of Alabama and Mississippi and from private individuals or organizations. In the contiguous federal waters, leases have been obtained from the U.S. government. It is rikely that additional leases will be obtained in the future. The lease holders intend to determine if hydrocarbon resources exist on their leased tracts in commercially recoverable quantities. If so, they intend to recover the resource for sale to the public. To do so, the lease holders must erect structures for the drilling of wells and the production of the resource, lay pipelines to transport the resource, construct and operate resource cleaning and handling facilities, operate and maintain facilities for servicing the drilling and production sites and dispose of waste products resulting from these operations. Lease holders must obtain permits for their activities from the Corps of Engineers and other federal, state and local governmental organizations. The information contained in the Generic Environmental Impact Statement will assist the District Engineer in making timely and responsible decisions on permit requests for the exploration and production of hydrocarbon resources in the coastal waters and wetlands of the Mobile District.

PUBLIC PURPOSE AND NEED FOR HYDROCARBON RESOURCE DEVELOPMENT ACTIVITIES

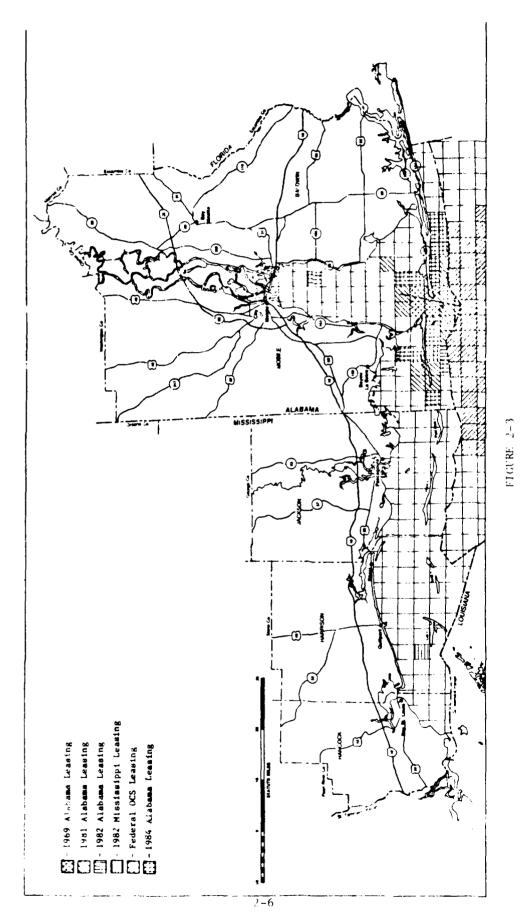
- 2.11 The quantity of petroleum resources imported to the United States has increased greatly in recent years. This has raised public concern regarding the extent to which the United States is dependent on a foreign resource and has increased awareness of the need to find and utilize domestic sources of hydrocarbons. The recovery of hydrocarbons from the study area will contribute to the domestic store of this resource, enhance the national defense posture of the United States by reducing dependance on foreign sources of hydrocarbons, improve the U.S. balance of trade and provide employment and income to the region.
- 2.12 The District Engineer must consider the environmental effects of oil and gas activities requiring permits from the Mobile District. These effects are discussed for the public record in the Generic Environmental Impact Statement and public comments are considered in preparing the doucment. This process assures that the need to develop hydrocarbon resources is considered in the context the need to protect environmental resources.

the "Secretary [of the Army, acting through the Chief of Engineers] may issue permits, after notice and opportunity for public hearing for the discharge of dredged or fill material into the navigable waters at specified disposal sites."

- 2.7aTo obtain permits for activities requiring them, an applicant submits a form to the District office before beginning any work. Applicants furnish a detailed project description including drawings, lists of adjoining property owners and status of approvals or certifications required by other federal and state agencies. Once the application is received, it is acknowledged, processed and u public notice is issued. Normally, there is a 30-day comment period when federal, state and local agencies, individuals and special interest groups may review the application considering various environmental and public interest factors. A public hearing may also be held during the 30-day review period. All comments are then considered by the Corps in evaluating applications. If no serious objections or questions are raised, about 60 days are needed for the process. If the application is approved the applicant signs the document, returning it with a fee, and the permit is issued.
- 2.8 The Mobile District, Corps of Engineers has three administrative options available to it regarding the disposition of permit applications for structures and activities associated with oil and gas development projects. These are as follows:
 - o Grant a permit as requested.
 - o Grant a permit with restrictions or conditions.
 - o Deny a permit.

INTENT, PURPOSE AND NEED FOR THE GENERIC ENVIRONMENTAL IMPACT STATEMENT

The District Engineer of the Mobile District, U.S. Army Corps of Engineers has determined that possible future development of hydrocarbon resources in the coastal areas of Alabama and Mississippi could potentially have a significant cumulative effect on the human environment, thereby requiring the preparation of an environmental impact statement under the provisions of the National Environmental Policy Act (NEPA). The intent of the study is to identify and consider the environmental effects that could result it permits the requested for and issued by the District for hydrocarbon resource development projects in the study area. These effects are to be considered in conjunction with resource development activities that could occur in contiguous federal waters. The cumulative effects identified in this document must be considered in deliberations by the District Engineer in future permit applications.



OIL AND GAS LEASING ACTIVITY

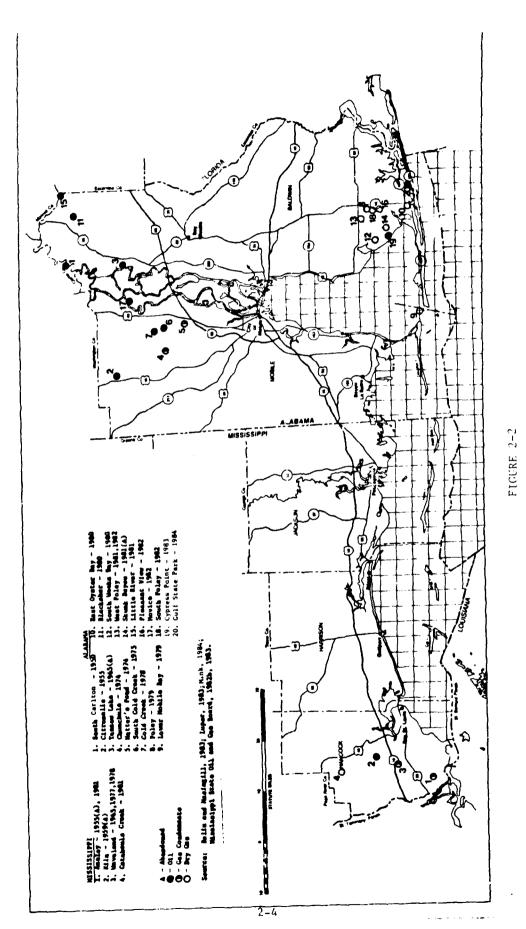
(Mobile County, Alabama) and in early November, 1983, two wells began producing commercial quantities of oil and gas. Within Mobile Bay, two unsuccessful wells were drilled in the mid-bay area in 1951-1952 and no further activity occurred until the 1978-1979 gas discovery in southern Mobile Bay.

- 2.5 Leasing in state waters of the study area was initiated in 1969 when Mobile Oil Corporation leased four blocks in southern Mobile Bay (Figure 2-3) (Raymond, 1982). Brilling of the first well on these tracts occurred in 1978 and 1979. Subsequently, development wells were drilled, and commercial recovery if natural gas from these tracts is expected to begin by late 1986.
- 2.6 Since Mobil's discovery, other tracts in the state waters of Alabama and Mississippi and in the contiguous federal waters have been leased. By late 1983, two of these tracts in Alabama waters had been drilled. Tracts leased to date in the study region and vicinity are shown in Figure 2-3.

AUTHORITY OF THE U.S. ARMY CORPS OF ENGINEERS

- 2.7 The U.S. Army Corps of Engineers must assess the environmental effects of a project for which a permit is being requested before making a decision on denial or approval of the permit. Authority for this is derived from several sources, including the following:
 - o The River and Harbor Act of 1989.
 - o The National Environmental Policy Act of 1969.
 - o The Clean Water Act of 1977.
 - o Rules and Regulations of the Corps of Engineers, such as:
 - Regulatory Program of the Corps of Engineers (33 CFR 320-330)
 - Environmental Quality: Policy and Procedures for implementing the National Environmental Policy Act (33 CFR 230)

Specifically, Section 10 of the River and Harbor Act of 1899 prohibits the construction of any structure in or over navigable waters of the United States and probibits the excavation from or depositing of materials in such waters, or the accomplishment of any other work affecting the course, location, conditions or capacity of such waters, unless the work has been authorized by the Secretary of the Army. Also, it is stated in Section 404 of the Clean Water Act that



OIL AND CAS FIELDS

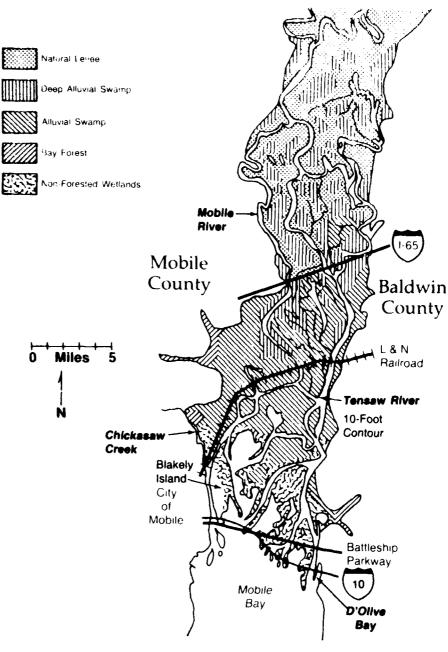
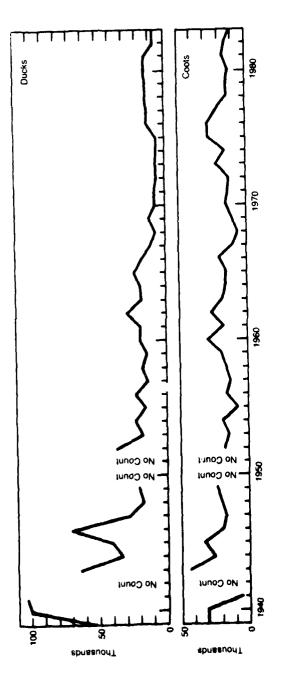
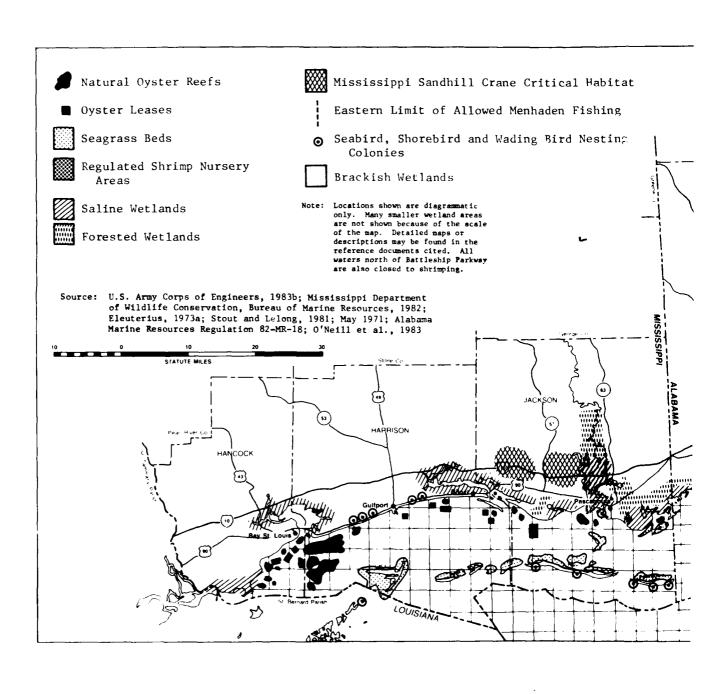


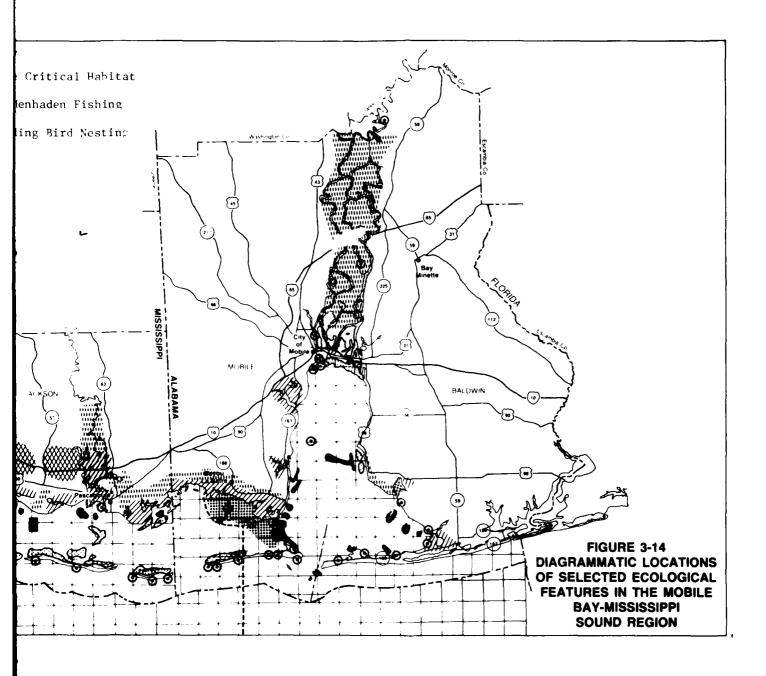
FIGURE 3-9
WETLAND COMMUNITIES IN THE MOBILE DELTA



JAMILARY COURTS OF WINTERING POPULATIONS OF BUCKS AND COOTS IN THE MODILE DELTA

Scurce U.S. Fish and Widthe Service, Startwille MS. Beshears 1979.



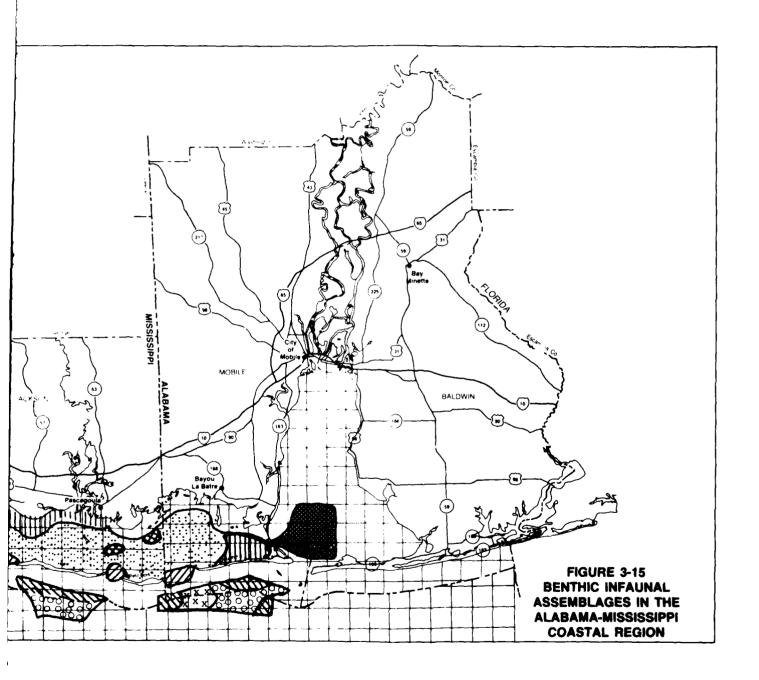


MISSISSIPPI SOUND AND MOBILE BAY CULF OF MEXICO Coastal Margin (mud) Mud Bottom Lower Mobile Bay (mud) Muddy Sand Bottom Open Sound (muddy sand) Clean Sand Bottom

 Communication

 Co ☑ Tidal Pass (clean sand) Shallow Sound (clean sand) Blank areas indicate no data in source cited. Source: Barry A. Vittor and Associates, Inc., 1982 MOBILE HARRISON

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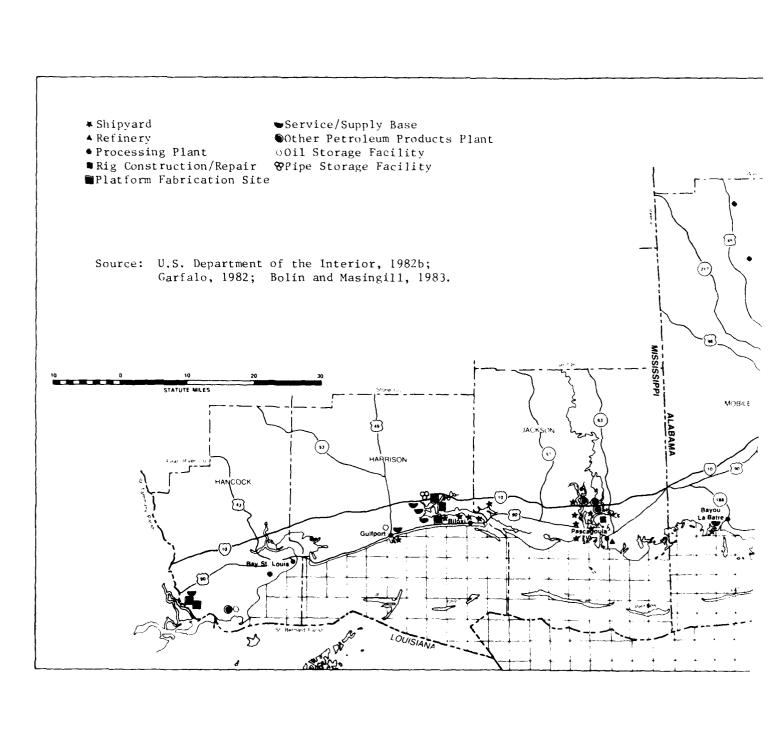
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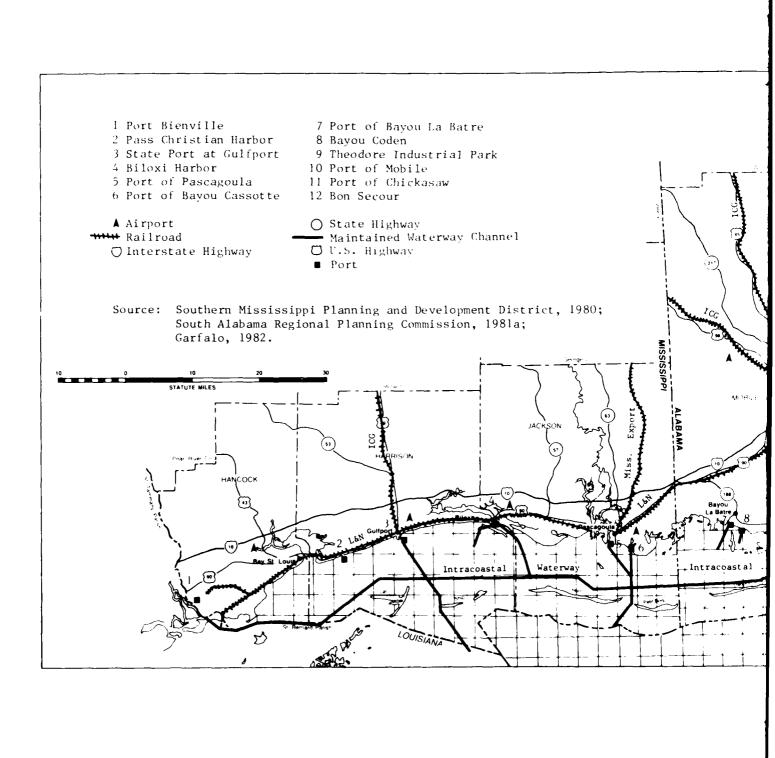
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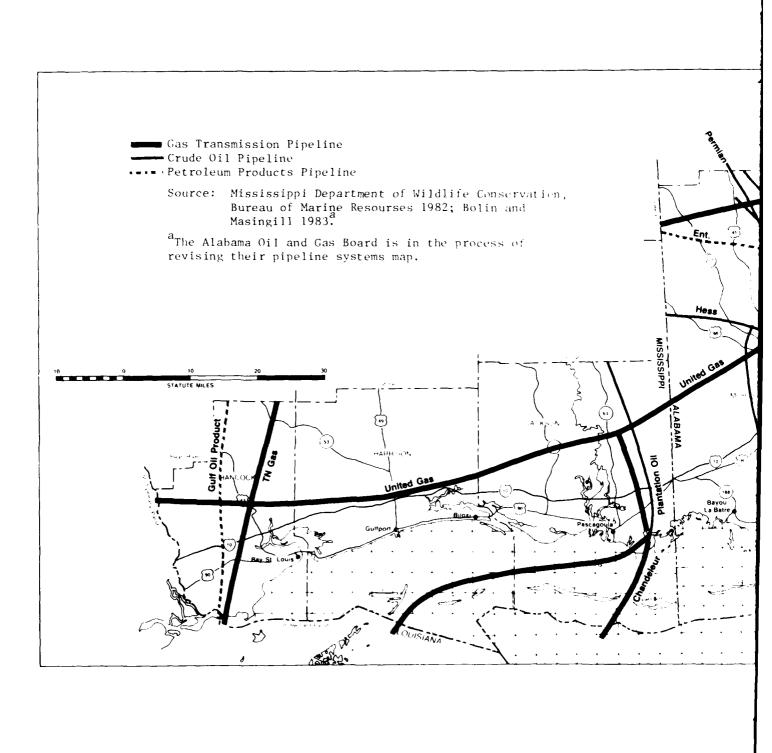
FIGURE 3-16
BATHVMETRY OF MISSISSIPPI SOUND

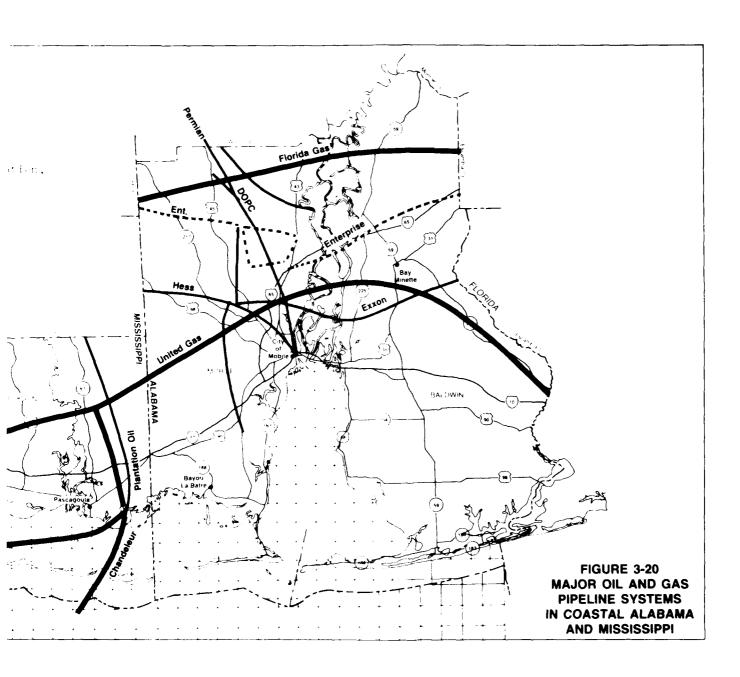
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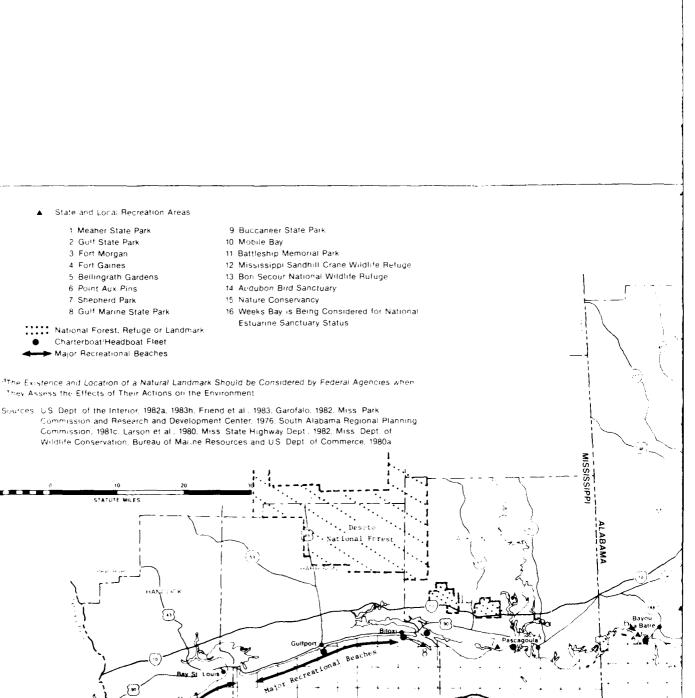
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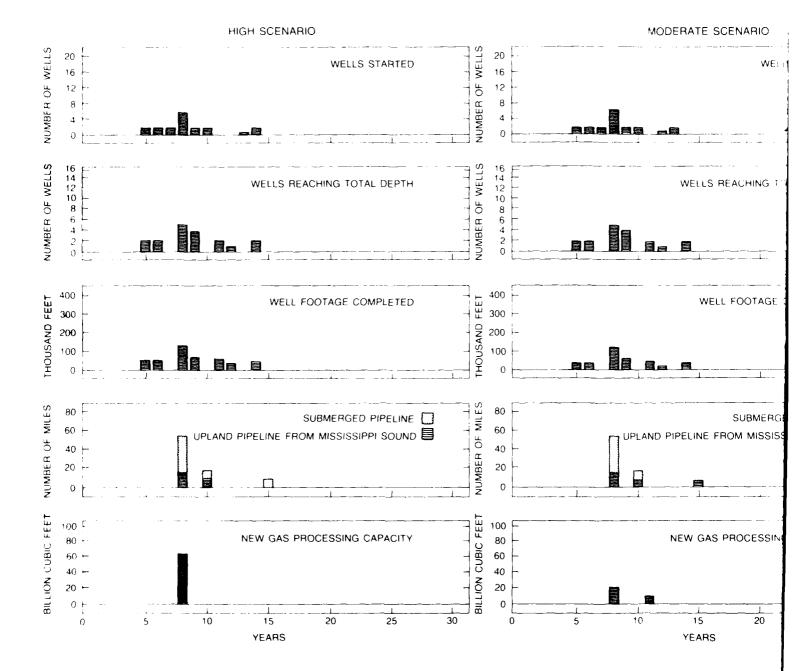








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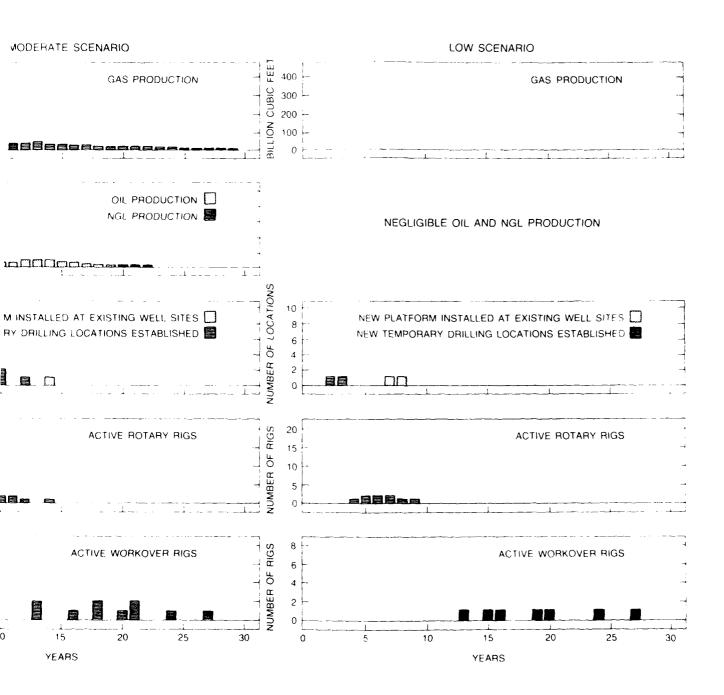
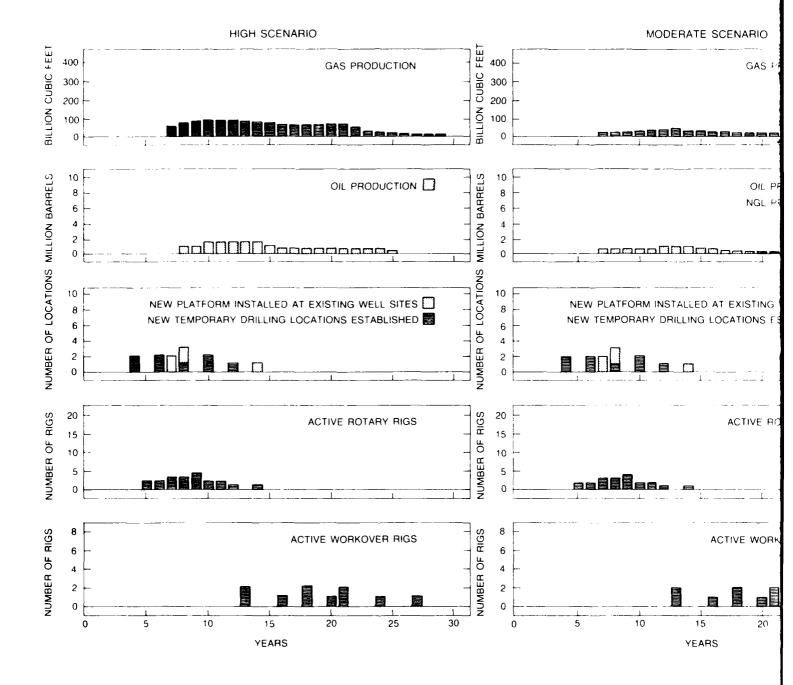


FIGURE 8-3
ACTIVITIES IN MISSISSIPPI SOUND RESULTING
FROM THE HYDROCARBON
RESOURCE DEVELOPMENT SCENARIOS



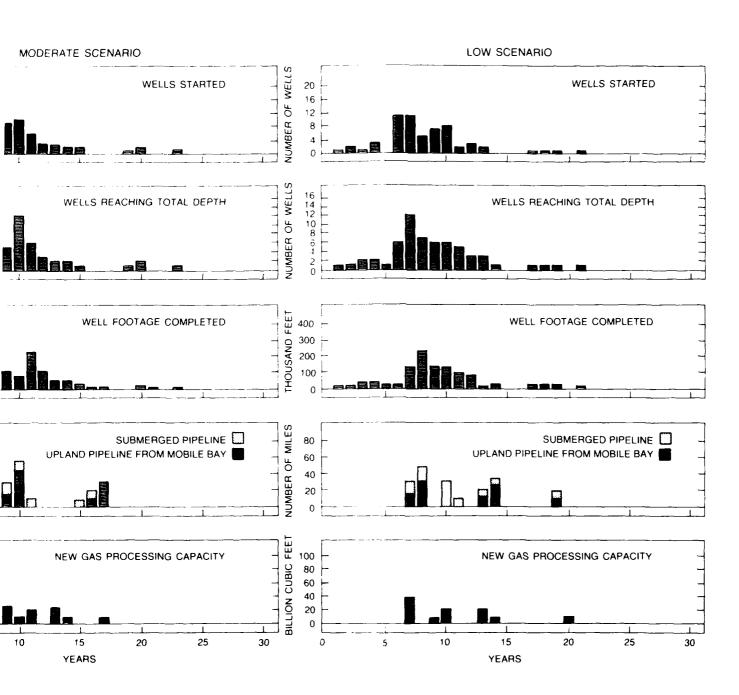
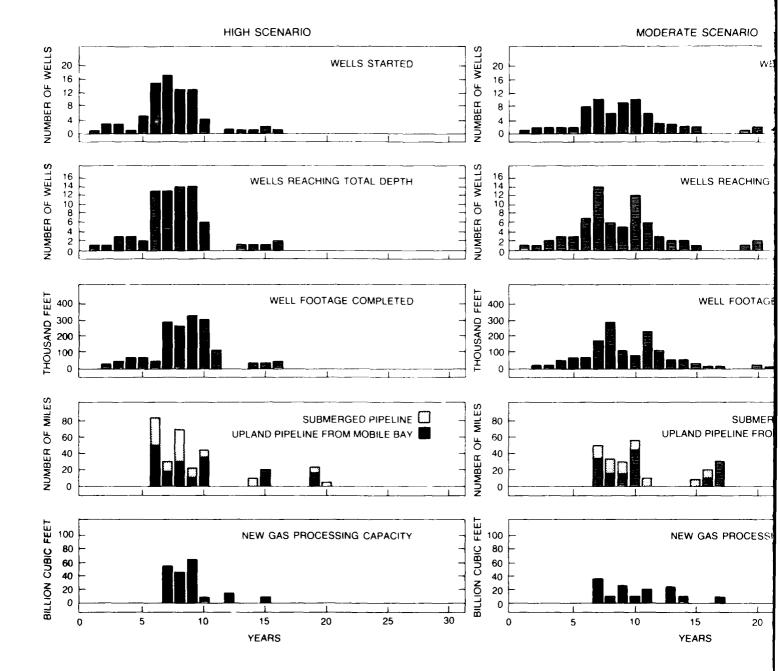


FIGURE 8-2
ACTIVITIES IN MOBILE BAY RESULTING
FROM THE HYDROCARBON
DEVELOPMENT SCENARIOS
(CONTINUED)



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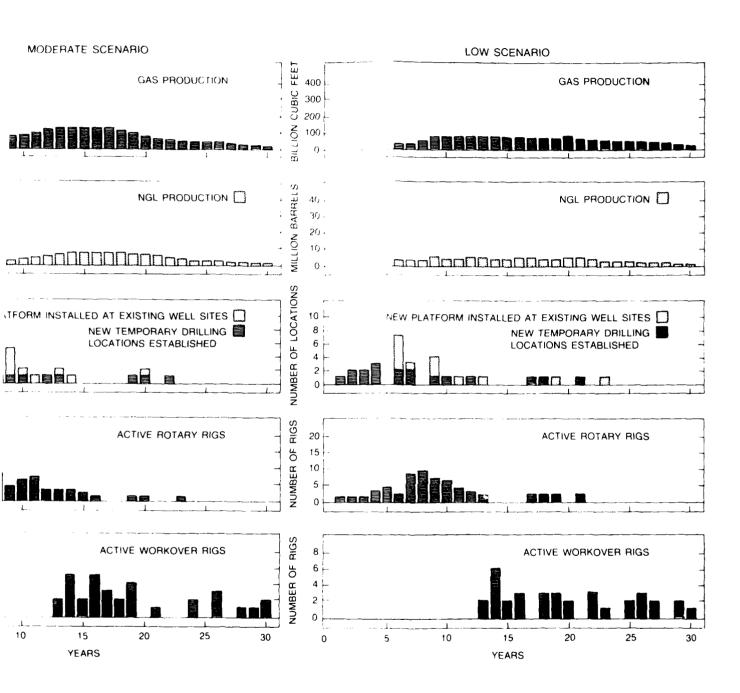
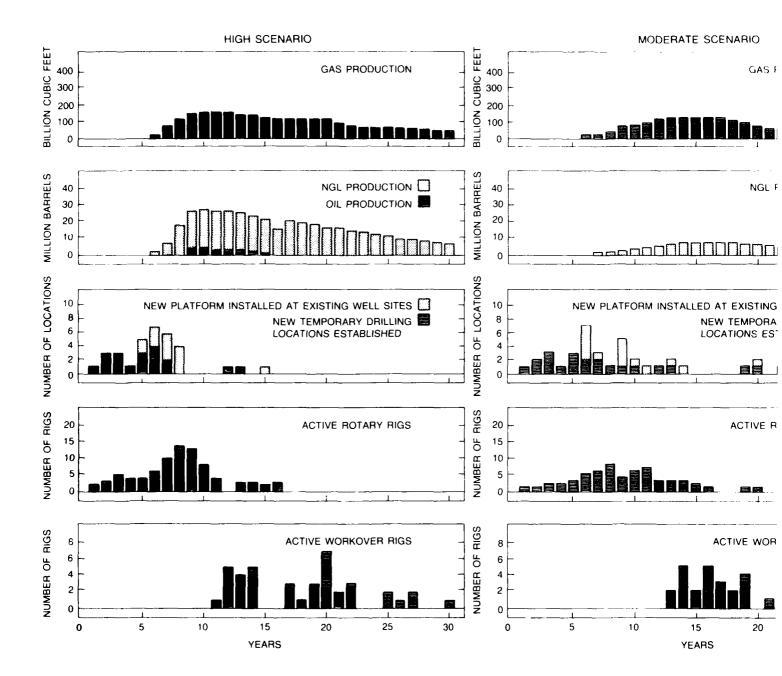


FIGURE 8-2
ACTIVITIES IN MOBILE BAY RESULTING
FROM THE HYDROCARBON DEVELOPMENT SCENARIOS

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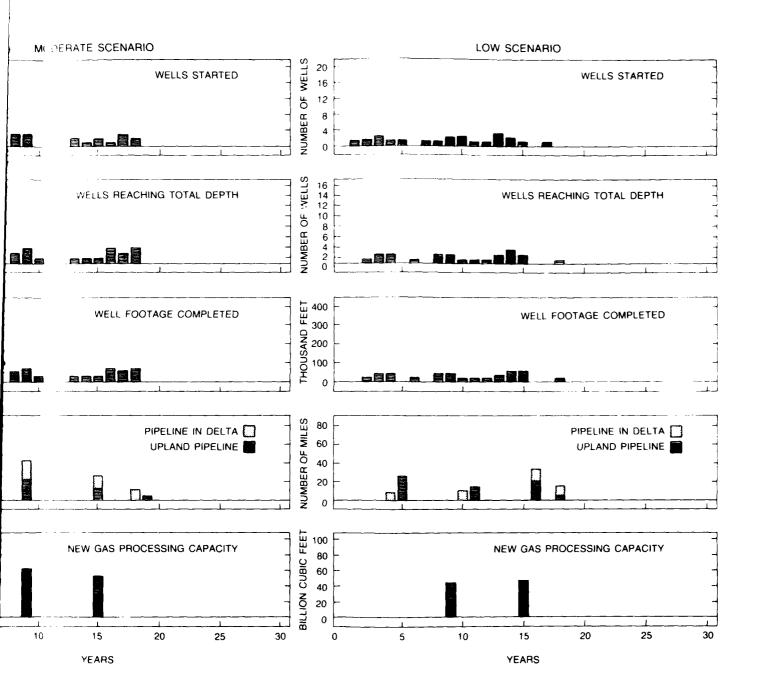
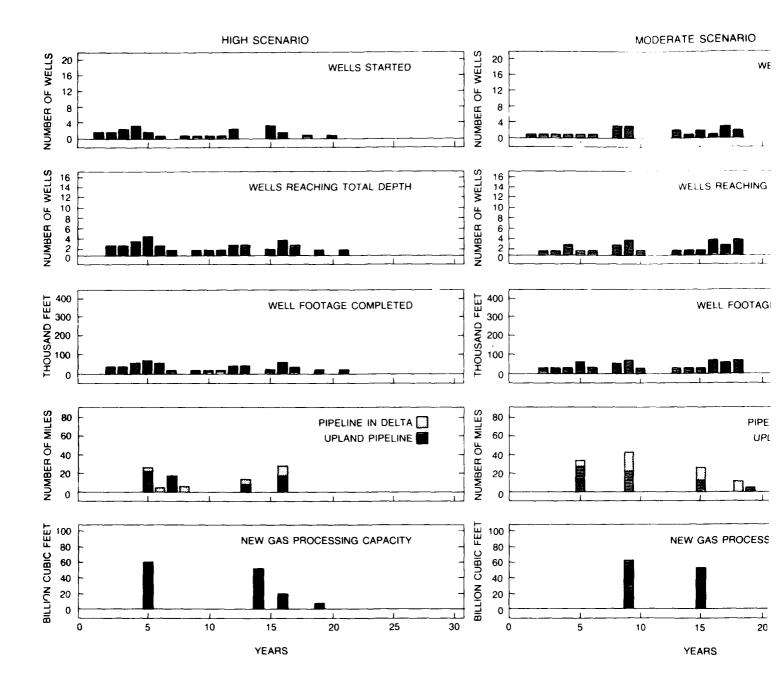


FIGURE 8-1
ACTIVITIES IN THE MOBILE DELTA RESULTING
FROM THE HYDROCARBON
RESOURCE DEVELOPMENT SCENARIOS
(CONTINUED)



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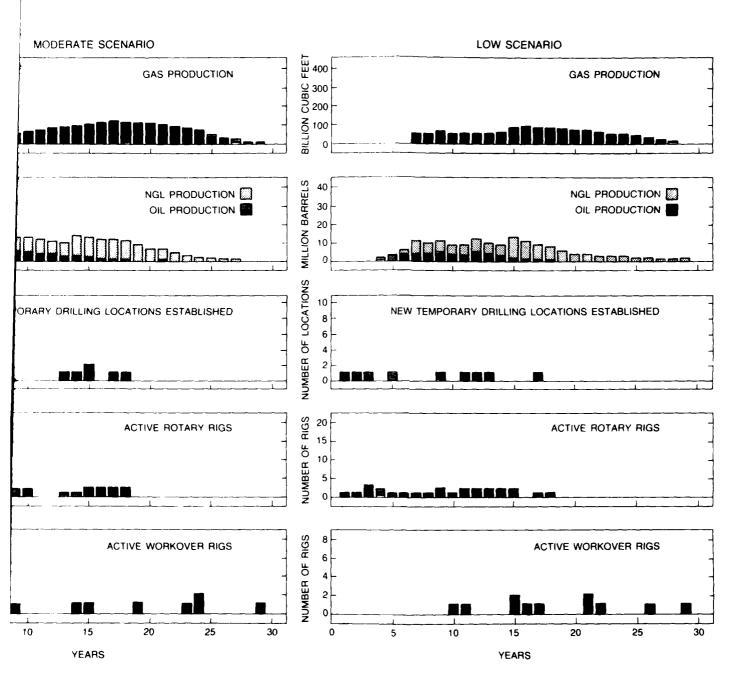
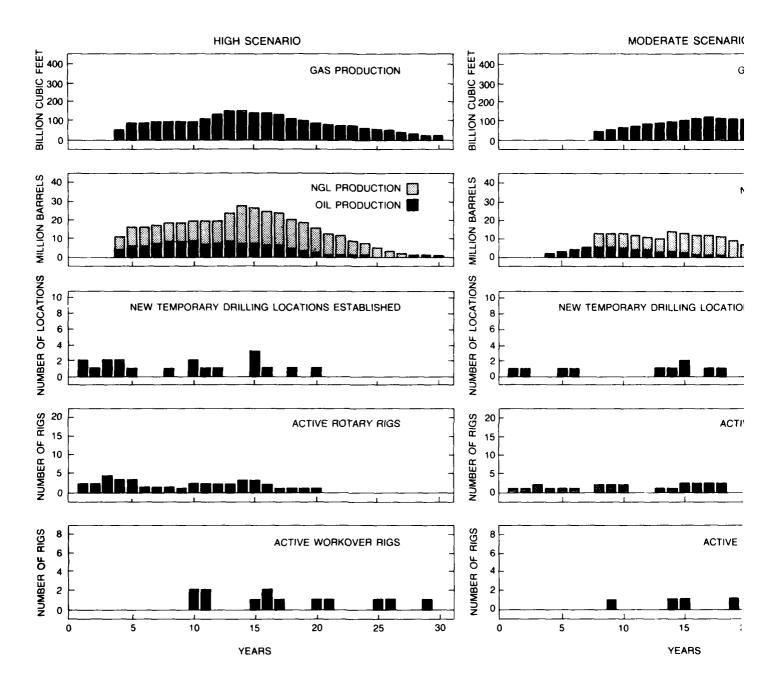


FIGURE 8-1
ACTIVITIES IN THE MOBILE DELTA RESULTING
FROM THE HYDROCARBON
RESOURCE DEVELOPMENT SCENARIOS

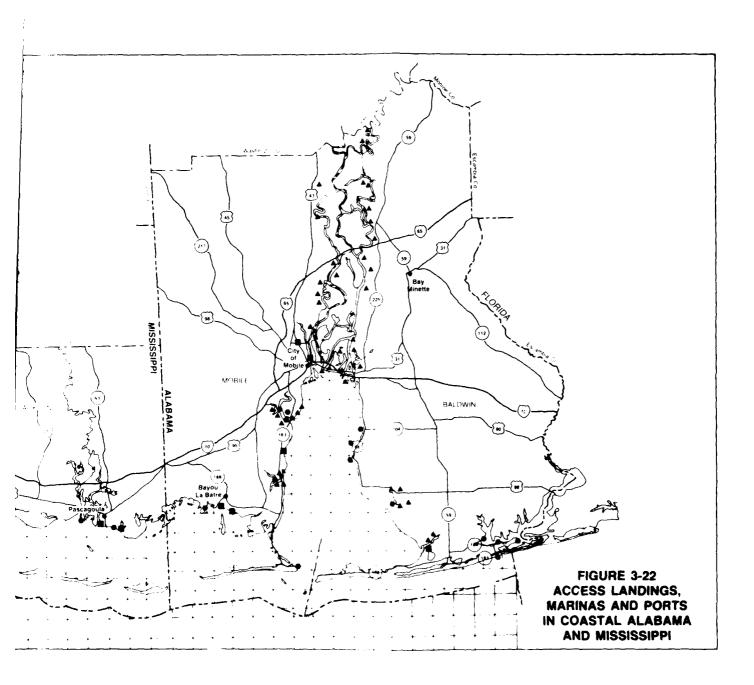
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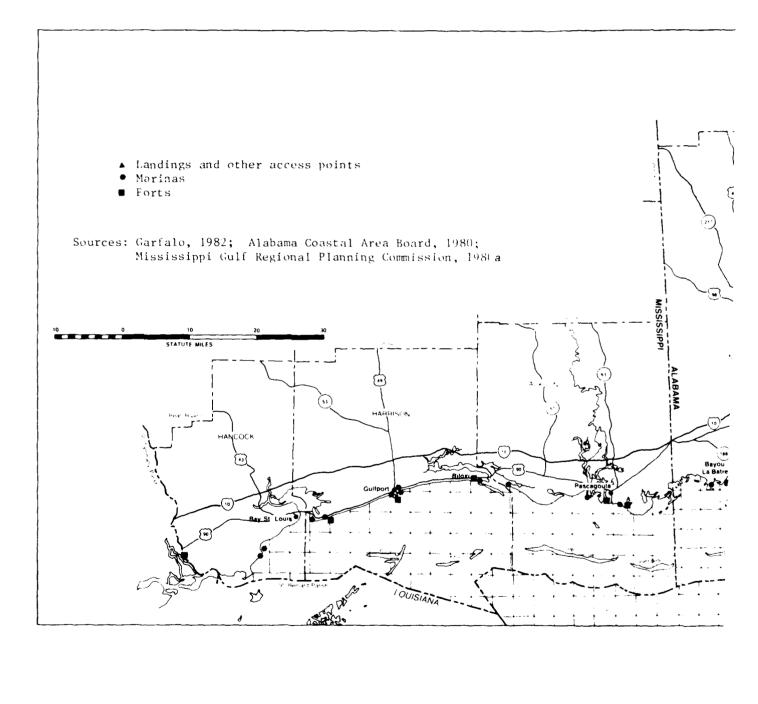


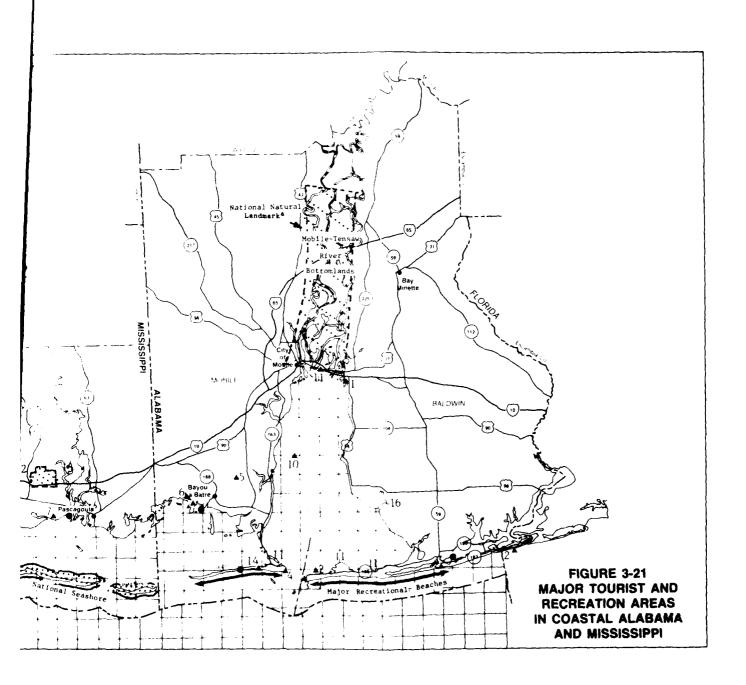
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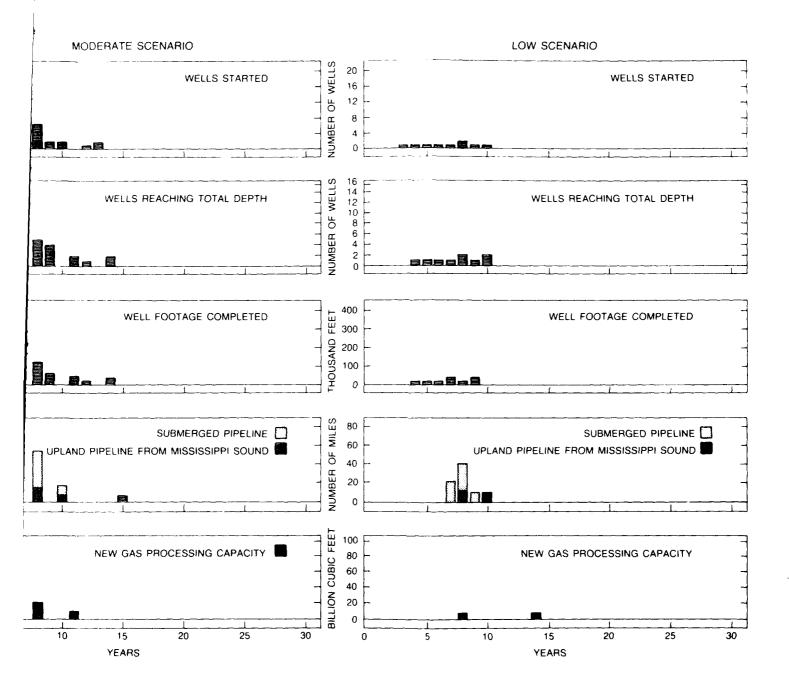
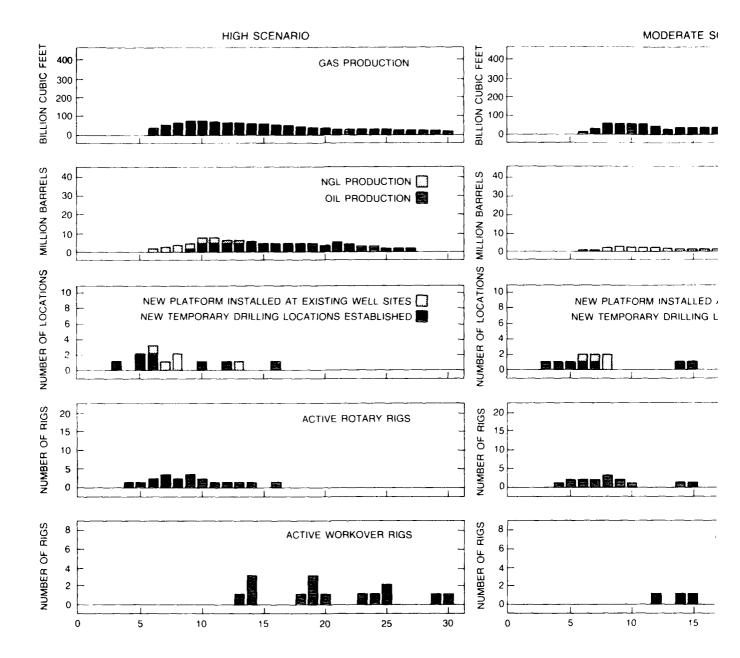


FIGURE 8-3
ACTIVITIES IN MISSISSIPPI SOUND RESULTING
FROM THE HYDROCARBON
RESOURCE DEVELOPMENT SCENARIOS
(CONTINUED)



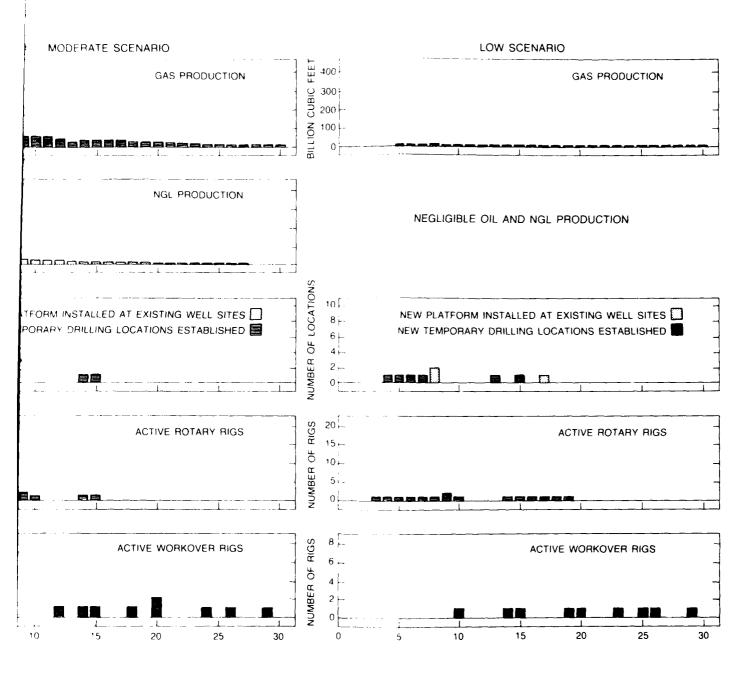
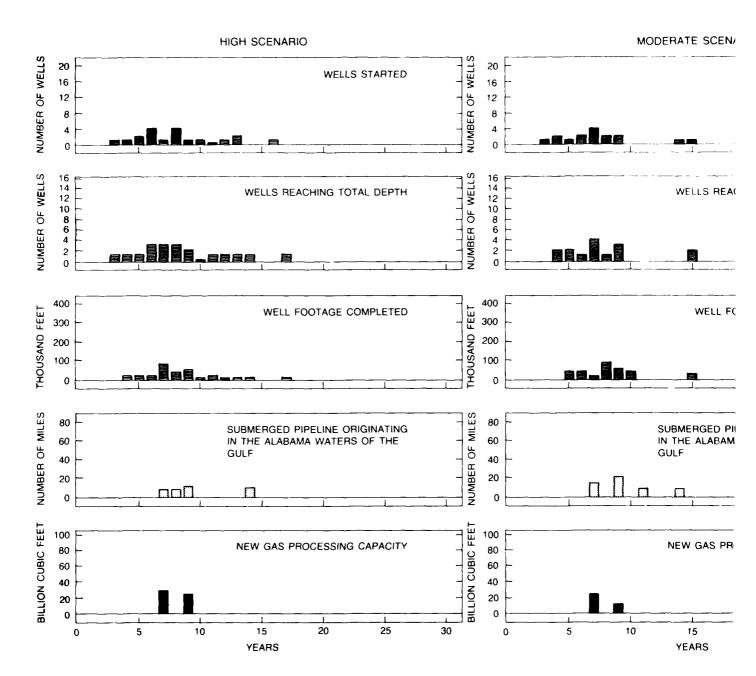


FIGURE 8-4
ACTIVITIES IN THE ALABAMA STATE
WATERS OF THE GULF OF MEXICO
RESULTING FROM THE HYDROCARBON
RESOURCE DEVELOPMENT SCENARIOS

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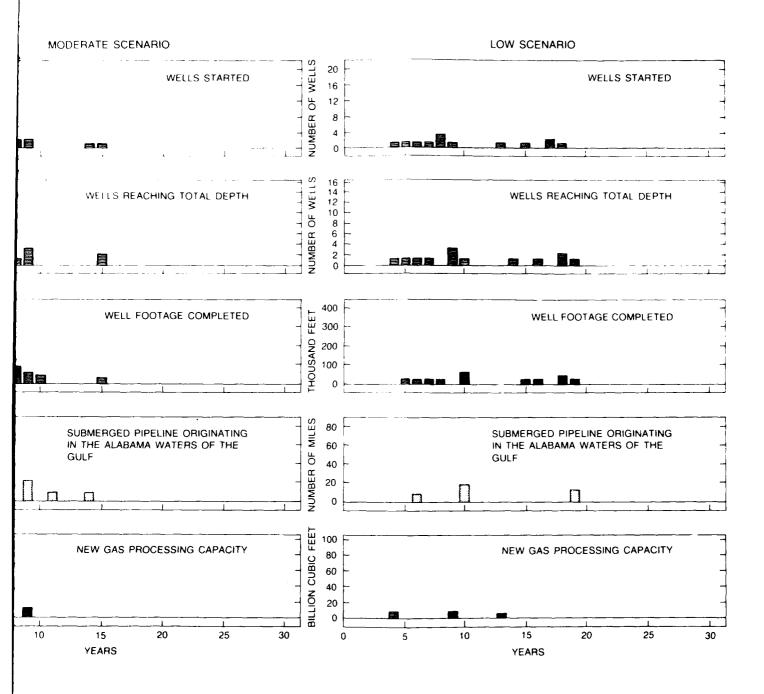
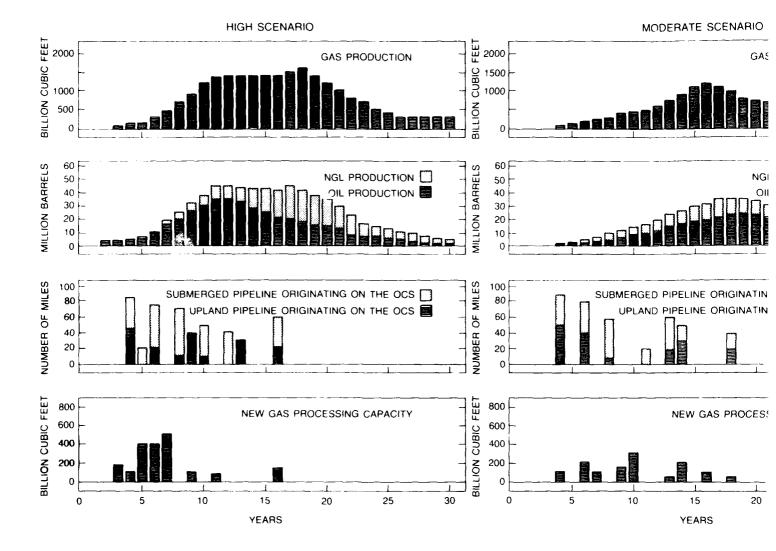


FIGURE 8-4
ACTIVITIES IN THE ALABAMA STATE
WATERS OF THE GULF OF MEXICO
RESULTING FROM THE HYDROCARBON
RESOURCE DEVELOPMENT SCENARIOS
(CONTINUED)

HIGH SCENARIO WELLS STARTED WELLS REACHING TOTAL DEPTH WELL FOOTAGE COMPLETED PELINE ORIGINATION IN THE MISSISSIPPI WATERS OF THE GULF NEW GAS PROCESSING CAPACITY 15 YEARS

NO ACTIVITY FOR MODERATE AND LOW SCENARIO

FIGURE 8-5
ACTIVITIES IN MISSISSIPPI STATE
WATERS OF THE GULF OF MEXICO
RESULTING FROM THE HYDROCARBON
RESOURCE DEVELOPMENT SCENARIOS



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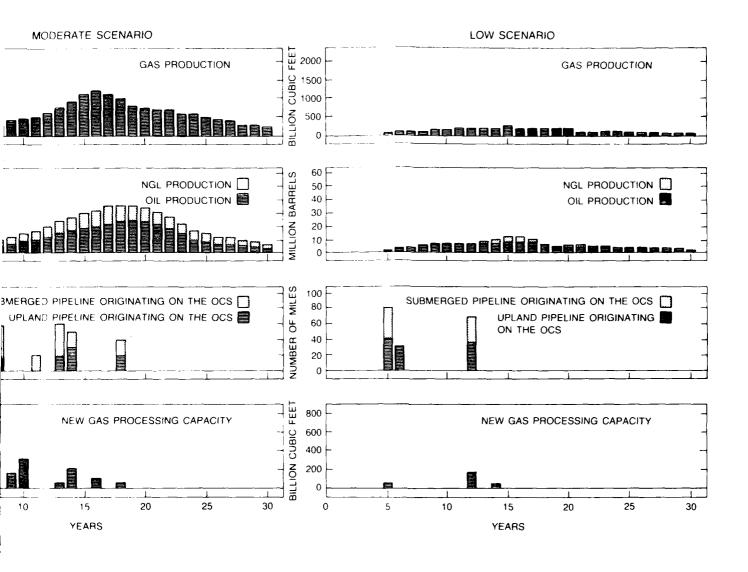


FIGURE 8-6 ACTIVITIES IN ADJACENT FEDERAL WATERS RESULTING FROM THE HYDROCARBON RESOURCE DEVELOPMENT SCENARIOS



TABLE 2-2

SUMMARY OF ENVIRONMMENTAL LOADINGS AND GENERIC EFFECTS OF THE USE OF SWAMP BUGGIES FOR GEOPHYSICAL EXPLORATION IN THE MOBILE DELTA

Parameter	Effect				
Surface Water Resources	Suspension of sediments along pull boat and/or marsh buggy paths. Short-term (less than 30 days) creation of shallow water channel less than 1 meter deep. Relatively small amounts of refined fuels spilled as a result of boat/buggy traffic and exploration activities.				
Wetland Ecosystems	l acre disturbed per mile of survey (no vegetation clearing); swamp buggy would push through brush and maneuver around trees.				
Drilling Fluids	Simple compounds used in small amounts (1/2 gallon per 100 gallons of water).				
Groundwater	Possible contamination of shallow alluvial aquifer from shotholes.				
Noise	Temporary increase in noise levels from vehicles. Impacts will be more intense than offshore areas due to the sensitive receptor nature of the Delta area. Noise levels similar to trucks are expected: 72-95 dBA at 50 ft.				
Solid Waste	Shothole cuttings and drill muds disposed as backfill in shothole. Less than '0 cubic feet of cuttings per 100 feet of shothole. Drill mud volumes include the volume of the hole and a small circulation tank.				
Air Emissions	Emission of pollutants from swamp buggles and/or small boats. Emissions (in tone/year/vehicle): TSP (.036), SO2 (.072), CO (.610), HC (.101) and NOX (.043).				
Socioeconomic Characteristics	26 to 32 people needed for a survey; hulf the craw could be unskilled local hirss. Skilled workers would commute on weekly basis and reside in nearby motel. Minor treffic increase at meeting point; exten- nive local purchases of gas, food and miror equipment repairs.				

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		e transfer dispersion descrip- ent of the electric Security	The property of the property o	Note as in and Butge Ensem mans,	ame as Triand Baryo Roser dank.		Camming effect of specifications, Petropolication of distributions of distributions via borrow treaches,
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			CATHERING SYSTEM CONSTRUCTION			
DAD AND TELL	WELL COMPLETION	PLATFORM CONSTRUCTION	ESTUARINE ECUSYSTEM	WELLAND ECOSYSTEM	BAR	
PARAMETER WATER QUALITY	Sediment resuspension and engine exhaust discharges from crew/supply boats and tugs. Resuspension of sediments from construction related activities.	Sediment disruption during construction of platform. treosote residue from timber plies. Engine exhaust discharges from crew/ supply boats and tugs.	In estuarine ecosystems, sediment resuspension from dredging. Release of nutrients and oxygen demand from sediments. Local changes in bottom water salinity. In wetland ecosystems sediment movement resulting in some leaching of nutrients, metals and humic materials.	Sediment resuspension and engine exhaust discharges from CreW/ supply boats and tugs.	Selimen dreimi drail. longina from I menda dril.	
HYDROLOGY	Local obstruction of currents by barge/boat.	Local obstruction of current by barge/boat.	in estuarine ecosystems, local obstruction of current by barge/boat. Local changes in bottom water circulation.	Channelization of water through pipeline trenches would occur.	Lecati currer	
WETLAND ECUSYSTEM	Continued loss of witland habitat.	Continued loss of wetland habitat (no auditional area disturbed).	Not applicable.	About 1 acre disturbe: per 1000 feet of gath- e.ing system (1/3 acre for dredged trench, 2/3 acre for work area and dredged material stock pile).	Same imm cove elic use	
AQUATIC ECOSYSTEM	Continued effects as for drilling if drilling rig used; localized turbidity increase it smaller rig brought in to replace drilling rig.	Effects the same as for drilling platform.	benthic habitat per 1000 feet of pipeline during construction; turbidity effects to benthic communities adjacent to dredging area.	Not applicable.	Short of her trent effect and e met d	
WASTE WATER DISPUSAL	Sanitary wastes from personnel, stormwater runoff from platforms, bilge and ballast water from boats and barges. No discharge; waste is stored on barges and hauled to treatment plants for disposal.	Same as Well Completion.	Same as Well Completion.	Same as well tompletion	. No. 13 versed by 1e versed	
GROUNDWATER	Possible aquiter contamination from formation additives due to unintentional fracturing of and subsequent communication through aquiculdes. Potential for introduction of hydrocarbon and formation waters and additives by casing ruptures during fracturing.	Not applicable.	No discernible impact.	Possible contamination of shallow aquiter the to piperine failure.	Si tress Error water Sector	

(ABA r. 2-8) (constitute f) 688 - F. F.NVIK (MENTAL L. (ADIN)) AND GENERAL FERRUSS (GENERAL ELEMENTS STEPLES AND 691. ING MORUS BAT AND MISSISSIPPI SAND

A. W. a.		JACKUP AND SUBMERSIBLE	nrilling RIG	FIXED PLATFORM		
	BOX FINE OPERATION	SITE PREPARATION	ROUTINE OPERATION	CONSTRUCTION	OPERATION	
apa 11.	Same as Basy/Sound.	No discernible impact.	Same as Bay Sound.	No discernible impact.	Same as Bay/Sound	
preparation for Walls (1997)	Name as intant driving harge.	Up to 12 people needed to bore soil, 4-10 jobs to drive pile for mooring. Extra tug contracted, 2-4 in crew. Rigging up involves typical drilling complement of 20 to 36 people.	Ü	Existing regional facilities could be used to construct platform modules. 50-80 people needed to install structure offshore; only a few positions filled by locals. Fugs could be local, 2-8 people needed. I month to install a platform.	Same as mobile rig.	
to deligate tracer to see the second tracer to see the second tracer tra	Increased waterway triffic same as for barge in open water; continue; impact from channel ireiged material pile.	increased water traitic (pile driver barge, supply barge, crew boat); estimated maximum increase: 3 trips per day (1 barge, 2 crew boats); 200 to 250 toot square work area closed to navigation.	Increased waterway traific same as for barge in open water; continued closure of drilling area to navigation.	Increased water traffic same as for barge in open water; continued closure of drilling area to naviation.	Same as construction.	

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TABLE 2-6 FENCE UNITED S MMARY OF ENVIRONMENTAL FADING AND GENERAL DRILLING MUBILE BAY AND MISSISSIFE.

	INLAND DRILLING BARGE					
	MOBILE BAY AND MISSISSIPPI SOUND		SALL MARSH			(A) F 1
PARAMETER	SITE PREPARATION	ROUTINE OPERATION	SITE PREPARATION	ROUTINE	∪PERATION	S. Ph. Philip
SOLID WASTE	No discernible impact.	Production of spent drilling muds and cuttings per av. 21,000 ft. well. Lquids: 23,500-184,000 bbl Cuttings: 6,000-9,000 bbl. Muds: 6,000-17,000 bbl. Disposed of at an approved site.	No discernible impact.	∿a⊞ਦ a5	Bay/Sound.	So HSC:
SOCIOECONOMIC CHARACTERISTICS	As many as 12 people in soil boring crew; company can be local or regional. Nearby firm could be used for foundation and pile driving, 4-10 are needed to drive piles. Locally based employees circulate wages in adjacent area.	Self-contained operation, 20-36 people on board 24 hours a day; little if any interaction with adjacent economy. Equipment and supplies transported directly from source or shuttled through staging dock; adequate ports available in Mississippi and Alabama.	Employment for 8-10 to dredge area, and prepare foundation; 4-10 needed to drive piles for keway. Local businesses could be used. Effects are same in Bay or Sound.	barge.	inland artiling	Up to 1. ; bore sol drive p Extra tu. in crew. ; involves complement people.
NAVIJATION	Increased waterway traffic (pile driver barge, supply barges, crew boats); estimated maximum increase: 6 trips per day (3 barges, 3 crew boats); 300 to 400 foot square work area closed to navigation.	Increased waterway traffic (mud and supply barges, crew boats); estimated maximum increase: 5 trips per day (1 supply barge, 1 waste barge, 3 crew boats); continued closure of drilling area.	Increased waterway traffic similar to barge in open water; dredged material pile next to dredged channel leading to access canal could prevent waterway traffic from crossing this area.	traffic in open impact	ed waterway same as for barge water; continued from channel material pile.	Increase: (pile tri supply ba boat), es mum itole per day boats); - square wo to haveka

No discharges are allowed from platforms or drilling barges with the exception of uncontaminated bilge and ballast water; discharges from marine vessels are allowed in conformance with U.S. Coast Guard regulations.

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LABLE 270 - MMARS - FIRSTE NMENTAL IMADING AND OBSERTE PEFFECTS OF DELLING MORITE BAY AND MISSISSIPPI SOUND

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15. 21	enument distuption of cost in manufacturing the cost fixed product from time of piece, significant incompact from the cost in	ie	Settment distorts a furing constitute of sold positions, close to resident term toward policy, incline extract is sorges from etch supplied outs and tups.	заше as Baldooung
Contestant as excit contestant, gradual design of the contestant and the contestant are contestant as the contestant and the contestant are contestant as the contestant are contestant are contestant as the contestant are contestant	local disturbance of currents around batges and boats. Increase to water velocities tue to canal-open water connection.	local distruance of currents around rig and service craft.	Sime as laux-up.	Same as Jack-up.
fower lows of wetcome tst.	Not applicable.	Not applied to	Not oprifestion	Not applicable.
get channe, sp: of treason material of treason material of community sol, i lifterer, exter sounder section of would not to	coss of 9.2 acres of additationer jackup- legs, 0.2 to 9.7 acres unfor oul; of submersible, towling community tability community tability community tability community tability community tability for perficiely both rigs, by differ ture fity farry fig pon-ement	entime tless of bester, firstat.		Continued loss of benthic habitat for drilling period.
institution of the	Cobme as flav Sound.	Name is Bally sound.	Name is Bay/seun(.	Same as Bav/Seund.
OS Bary (course)	Not applicable.	Same as Base onel.	No fis erichle Empart.	Same as Bay/Sout.:
zutwochafung Jhaultou (mi	Pmissions from affile fig. Pmissions lin tons per .	this support (edicines) in drop ISE 13,42 ,	Colors the effect sating of	ompletion and work-over, (2), and NOX (390.75),
is May sympt, Nodse Dimpote must estim Locality to eptor e ines.	Notice level increase fue- to-marine traffic and possible transport by fell-opter, carge tue, foates: 1800 of Marine and ft. 180 alones worth a possible traffic and ft. Motorcouts No. 18A have, in ft. telicopter: [50-40 dRA]		Some is Syrrap,	Same as Bay/Sound.
		<u></u>		

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LABLE 2-0 SEMMARY OF ENVIRONMENTAL LOADING AND GENERAL SEFECTS OF DRILLING MOBILE BAY AND MISSISSIPET SOLN.

FARAMETER	M BILL BAY AND MISSILE PREPARAL N	Sinsiffi (2002 8 % ilno desKAli (8	SATE MARSE SITE PREPARATION	K T. INF FERAL N	Sale PREPARATION	2.11
HATEK (MA.III	circulation, satinity in sentement disruption from pile and sheet driving and access freelying. Possible release of nutrients and exwen- lemanding substances from freegen sediments. Resuspension of sedi- ments during social par placement, recoste resting from timber piles. Sediment re- suspension and engine exhaust discharges from trew supply boats and tugs.	weimment resuspension uni- engine exhaust discharges from trew/supply boats int tugs.	same as Bay/sound:	same as Balisount.	Seriment inscription to legs for exempting positivate, a record festion from finite places, fraging exhaust tissimages from a rewesting, beats and tugs.	.1
nYDR (1965)	Smark emounts of local disturbance of currents around farges, boats and dreigel areas.	local disturbance of urrents around barges and fredged areas.	local disturbance of currents around access dredging furing sign tire submergence of saft marsh. Increase in water velocities fue to canal-open water connection	local fisturbance of currents duting with fide submergence of sail marsh. increase in water velocities due to canalogen water connection.	insal listurbance of currents around barges and boats. Increase in water velocities the to canal-toped water connection.	To all streets and section with the section se
WETLAND ECUSYSTEM	Not applicable.	Not applicable.	Same as for canal and sil, in Delta: 5 acres disturbed for barge silp, 5-6 acres disturbed per 1000 feet of canal.	Continue: loss of wittan: Habitat.	Not application.	N 1 34
AUGATIC ECOSYSTEM	loss of 0.3 to 0.7 acres of bentide hapitat (burief under shell pad); fouling community habitat created on sheet steel 0.5 acres; turbifity generated in placement of shell put and by vesse; propwash.	continued loss of benthic tabilat for drilling period; localized increase in turbidity.	Benthic habitat jost in dredged channel for salt marsh access: 3 acres lost per 1000 feet of channel if 1/2 acres for fredged material storage). Turbidity from channel dredging could affect cyster populations.	Dredged channel and actea of freeged material country to control to the third community count be different. Tyster reefs under selfment layer would not be reestablished.	nose of U.2 deres of additate under jac-up legs, U.4 to 0.7 acres under oull of submersible, touling community habitat created on underwater portions of both rigs; localized turbility unlarget underwaters.	<pre>httld://pengil</pre>
MASTE MATER DISPINAL	Sanitary wastes from per- sonnel, stormwater runoit- trom plattorms, bilge and ballast water from boats and barges. No fischarge.'' waste is stored on barges and cauled to treatment plants for fisposal.	Sanitary wastes from personnel, stormwater runoff from platforms, bilge and barrast water from boats and barges, drilling multiquids and formatton water. No discharge; [1] waste is stored on barges and hauled to treatment plants for disposal.	Same as Bav/Sound.	Same as Bay's and.	same as Sav/Sound.	nd¶e iv
JR PUNDWA LEK	Not applicable,	Possible contamination of treshwater aquifer by exposure to drilling musts, formation waters or hydrorarbons through improperly sealed wells, cashing ruptures, or natural tructures in aqui-ludes.	Not ≇pplicable.	Same as Bay/Sound.	Not applicable,	Samer to
CE EMISSI NS	rmissions from freige, pice ompletion information has 5.0%, and N.X (390.1).	itiver, drill rig, and suppolisions (in tons per year):	ort venicles. Includes rig TSP (13,47), Soz (26,14),	activity suring to (163,21), 180	Emissions trom aril, rig - Emissions (in time per vec	
-dSt	Noise levels increase the to pile triver and increase mache traffic logbouting sead (BA), p. 100 tr. Pile injection and (BA), p. ft.	increase in noise levels from operation of frilling equipment and support etivities, energy frill rig; 5 × 18A, 100 ft.	Same as Bay/Sount but with fredging noise added;	Same as Bar/Sound. Noise levels more noticeable near sensitive receptor storelines.	Noise level increase due to marine traitie of possible transport by belicopter, large the, loaded 104-20 dMA 1250-300 tt, rug alone 147 dMA 1250-300 tt, rug alone 147 dMA 1450-300 tt, rug alone 147 dMA 1450-300 tt, rug alone 147 dMA, rug alone tt, rug alone tt, rug alone tt, rug alone tt.	Same ()

Parameter	Seigmic Survey Boats in Bay and Sound	Marsh Buggies in Salr Marsh
Surface Water Resources	very short-term (less than I hour) turbulence due to boat wake and possibly due to explosion activity. Relatively small amounts of refined fuels and oils spilled as a result of boat traffic and exploration activities.	Suspension of sediments along mersh buggy path. Short-term (less than 30 days) creation of shallow water channel less than I meter deep. Relatively small amounts of refined fuels spilled as a result of marsh buggy traffic and exploration activities.
Vquatic Econystems	Poten' al minor effect from survey boat and sir gun operations.	Not applicable.
Wetland Ecosystems	Not applicable.	l acre disturbed per mile of survey line. Vegetation crushed. Excessive rutting could siter water flow patterns. Soil compaction could hinder vegetation recovery.
Drilling Fluids	Not applicable.	Simple compounds used in small amounts (1/2 gailon per 100 gallons of water).
Wastewater Disposal	Sanitary wastes (10 to 40 gallons per pewastes would also be discharged in the ecosat Juard regulations.	
Groundwater	Not applicable.	Possible contamination of shallow aquifer from shot holes.
Air Emissions	Emissions from survey vehicles. "Mission, 14) co (1.21), HC (.20) and NOX (.10).	
Roise	No discernible impact. Noise levels similar to ambient marine traffic.	Temporary increase in noise levels from survey vehicles. Noise will be more noticeable in sensitive receptor shore-line areas. Noise levels similar to trucks are expected: 72-95 dBA, 50 ft.
Solii Waste	Shothole cuttings and mud disposed as backfill in shothole. Less than 10 cubic feet of cuttings per hole. Drill mud volumes include the volume of the hole plus a small circulation tank.	Shothole cuttings and drill muds disposed as backfill in shothole. Less than 10 cubic feet of cuttings per 100 feet of shothole. Drill muds volumes include the volume of the hole of a small circulation tank.
Socioeconomic Characteristics	15-16 member crew on 2 boats for a 14-day tour, 2-3 could be local hires. Intermittent interaction with shore to purchase supplies, fuel or fock between contracts.	Employment for 5-7 technical surveyors, 9 operators of 3 shot hole rigs, and several unskilled laborers. Laborers could reside in the adjacent area. Purchases of gas, food and minor repairs -ould be made in adjoining communities.
Vavigation	Potential impact from survey boat towing mile-long survey cable.	Not applicable.

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SUPPARY OF THE EFFECTS OF SPILLS OF MATERIAL OF RELEASE TO THE ATMOSPHERE. OF MATURAL GAS CONTAINING H2S IN THE TOBLIE DELLA

Spills trade Oil Be gre state and Concer Feel Oil Chemicals Drilling Marks Brilling Marks Atmospheric Release of H2S in a candidate of H2S in a candidate of H2S in the candidate of H2S in	Direct touic effect on organisms downstram if spill in large and we omtained. In southern belta, waterfowl could be greatly affected if present to large numbers. Aromatic fraction would be diluted and evaporated. Much of saturated fraction carried to sediments. Persistence of oil in sediments for many years is possible, especially in floodplain area. Subjettus effects on productivity and sediment organisms could last several years where oil 75,000 rollows were great enough. 75,000 rollows and critical parks storage tanks. 40,000 gallons in fuel transport barges. Effect of spill would be similar to crude oil spill. Volumes spilled would be small. Effects, if any, would be localized because oil dilution.
	storage tanks. 40,000 gallons in fuel transport burges. If any, would be localized because of dilution.
	es spilled would be small. Efferts, if any, would be localized because of dilution.
	Most material would sink to bottom at site of spill. Tutbid plume of small quantity of fine material would extend away from site. Effect would be localized. Material slowly diluted in channel by bedload transport. Spill in canal would be burief when canal restored. Some localized contamination of groundwater rould occui.
	hist gas would bubble to surface. Hydrogen sulfide dissolved would be oxidized and diluted in water column. Gould be sume effect in confined canal.
over ,	HSS is heavier that air, but normally it is released under pressure and mixed with methane which is lighter than air. Infithally, there would be some vertical distribution of the H ₂ S because of mixing with methane. Most regrain the top-spicont show a "fall-safe" or emergency planning smalysts which would preclude over an B hour day showlid or flora and fauna. Generally, the belief is that concentrations greater than \$0.0 ppm over an B hour day showlid by avoided.
There and do different forms of the forms of	There are basically two types of arcidents; pipeliae rupture and well blowouts. Studies of various site, pressure and duration pipeline ruptures indicate up to 11 million cubic feet of H2S gas may be released. Under these conditions, concentrations between 117 and 154 pap have been calculated at distances equal to or less than 200 meters from the break. Well blowouts are more likely to occur where they affect oil company prisonnel. In general, procedures for minimizing the likelihood of such an event have been well documented and safety training 15 an integral part of oil rig personnel. Again, here concentrations usually are less than 300 ppu relatively close to the source.
The h	The havind associated with either of these two types of accidents is dependent upon the distance between the loca- tion of the accident and the prevailing wind at the time of the accident-regardless of the groupsplaced area.
Sw toeconomic An arcider Characteristics area for t	An accident could affect use of waterbody by hunters, boaters and fishermen. \$4.9 million innually spent in Delta area for tackle, food, lodging and biat. Waterfowl hunting could be effected depending on time of the year of the accident.
Sp'lls Mell Servicing Snive	Snivents and materials used in small volumes. Effects, it any, would be very localized.
Pipeline Rupture Crude	Crude oil released in wetland at low water would kill vegetation in area affected by pooled oil. Oil released to water would have effecta described for spiil during driffing.
Well Workover Activ	Activity is like drilling phase—Spills would be statlar to those described for drilling.
bulanced Recovery Mater	Materials such as water, steam and GO2 would have negligible eitects it released. Other chancels that wight be used enaid have mame effect depending on circumstance of spill.
Pipeline Rupture Releasing Natural Gas Containing H2S Sum	Some as drilling.
Socioeconomic Characteristics Same	Same as draiting.

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Water Quality	Sediment disruption from removing familiaes. Turbidity plume in canal and river as diedged area is returned to its original contours. Concomitant releated of oxygen-demanding organics and any soluble nutrients. Sediment resuspension and engine exhaust discharges from supply/crew boats.	Selfment its aption from recording we we ground structure. If we retain in ground.
Hydrology	Only local obstructions of natural natural currents from barges/boats moored in the river assuming predevelopment site conditions can be achieved.	Not affected except slowly as natural werland vegetation fills pipeline right-of-way.
Wetland Ecosystems	Canals and slips restored by filling with stockpiled dredged material and extra fill as needed; recovery under platform and treatle.	Vegetation succession would result in regrowth similar to adjacent areas.
Aquatic Ecosystems	Refilling canals and slips would bury aquatic ecosystem that had developed. Ending of vessel traffic would eliminate turbidity from propwash.	Not affected if pipelines abandoned in place.
Wastewater Disposal	Sanitary wastes from personnel stored in tanks/barge and hauled to treatment plant for processing and disposal.	Flushing fluids collected at processing plant.
Groundwater	Possibility of improperly plugged well providing conduit for formation waters to flow to surface and impact shallow squifers through infiltration or loss directly from abandoned well to freshwater squifer.	No discernible impact.
Noise	Noise level increase due to general construction activities: Welding: 77 dBA (average) Backhoe: 85 dBA, 50 ft.	Same as well sites but only applicable to above ground structures. Pipes remain in ground.
Solid Waste	Generation of general construction waste. Impact minimal. Disposed of at an approved site.	Same as well site for above ground structures. Pipes remain in ground.
Air Emissions	Emissions from service vehicles. Emir TSP (.003), Sn2 (.006), CO (.05), HC (
Socioeconomic C.aracteristics	Employment to remove platform and equipment. 4 to 10 to remove mooring structure and 8 to 10 needed to refill canal and slip. Local nursery could revegetate and monitor succession. Severance tax and royalty collection would terminate.	At most a small crew would flush and clean the pipe- line. No significant effects would be likely.
Navigation	Increased waterway traffic (barge, crew boat); estimated maximum increase: 3-5 trips per day (1-2 barges, 2-3 crew boats); removal of production platform and mooring piles from channel would remove potential hazard to navigation.	Not applicable.

¹No discharges are allowed from platforms or drilling barges with the exception of uncontaminated bilge and ballast water; discharges from marine vessels are allowed in conformance with U.S. Coast Guard regulations.

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(STAN) BARGE 61	eft N. RN Are Fixel Fixel Fixe	BOAND KIAD AND SING T	AS LIFT	ENHANCED RECOVERY	MATERIAL INJECTION
Similar to increased noise from Medicards onlietter, generally of a Storeer increasing to 8 years.	Manual Countries	same as include barge rig.	increased noise levels but to the use of compressors and pumps and service vehicles.	Pump: 76 dBA, 50 ft. Air compressor: 92-100 dBA, at source. lug: 54 dBA hgg), 100 ft. No pump/compressor noise is pressurized gas is revocled (vis pipes) from freatment plant.	
Production of Trilling Tubit's statical to exploratory irruling, mode, rement, atthough and tracting testicals. Dislicing fution 2000 frowers, Dislicing testion product approved site.	same on Issue, Sorge Time	amber (March State Green) (1986)	No issentible impact, assuming to new wells are iffiled	No discertible impact.	No :incernible impact.
outeras contrat. off store influing coefficients	Home and the real country with a country taken by country	Chemical Constitution of the Constitution of t	if lew pipe, the weather problem to the publishments and effect would be the same each title. The same each title.	hame as equipment installation on production platforms.	it new wells, pipelines or platform equipment are needed effects would be the same as initial activities.
on Tridge 1 wateries Interly Surger he system Mother view Trigge, Telego, Tele	order as the targe with set printing except from from two could range from the could range from the could be the could be compared to the country of the cou	Not dipolent or	Not appoliatio.	Not applicable.	Similar to initial drilling operation.
	Similar to Distribute the fine from Medical to Distribute the fine medical configurations of the first and the first term of term of the first term of the f	Similar of treamed to the from Method to the first to the	Similar in the reason of the second of the s	Similar to proceed to the second color of the	Station : Distinct the second of the second

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TABLE 174 Concluded COMMARY FENNIR INMENTAL LIADING AND GENERAL HAS BEEN PRODUCTION IN THE MEDICAL CONTRACTOR OF T

		ATHERING	SYSTEM CONSTRUCTION		NUEMAL DEBRALLON DE HELLOT	
	William Mr. Cr.	#FIGANDS BURING		True Av. d. S.	AND FIPE, INC. GAUTERING SYSTEM	AND THE TANK THE PER
PARAMETE.	Will COMPLETION	#F .: ANUS	BORING	TRENCHING	11116	INLANT BARGE FIG
NOTSE	increase in noise levels associated with opera- tion of generally gasaler drilling rig. Also noise from pumps, compressors, litts and boats. Pumps: 76 dBA, 20 tt. Air Compressor: 92-jud dBA, at source.	insreased noise levels from land (leating stor- ested wetlands), frag- line/backnow wetlands), Land trending: 88 dBA (average).	Same as welland/water, substituting a boring rig for tren-ling equipment.	Same as Willan; Water.	antermittent modes execute to the fitted imperation and interface of the control	Similar to increa noise from well completion, where of a storier outs of the B weeks
S 0.10 WASTE	Production of small amounts of cuttings and mude, mostly formation fluids with completion additives. Disposed of at an approved bite.	No discernible impact,	Cuttings and inert muds generated equal to the volume of the bore. Disposed of at an approved site.	No disvernitie impact.	No discernific impa to	Frequetion of tri fluits Similar to explorators iril muls, cement, or and frasturing of cals. Drilling 2,500 briswell. posed at approve
SOCIOEGOSOMIA UMARACTERISTICS	me ni the busiest phases; traffic and personnel increase. 8-15 additional person board at once. More barges and tugs, probably from local business. A crew of about 10 needed to install production platform and minimum equipment.	10 to 1d0 workers needed to survey, clear, law and secure the pipe. 602 could be local labor. Monetary influx to acquire rights norway. Temporary effects on wages, taxes, and local purchases. Iraffic increases at staging area from workers and material deliveries.	Employment for 30 people. Specialized crew used, stavs in local motel for the 4-6 weeks of the project little if any local employment. Minor retail purchases made by employees, short term traific increase at landing, crew boats could be locally contracted.	Personnel and effects same 46 in gathering sostem constitution in wetlands.	State bogins se erance tax and recall collection a \$007cml followed; earn \$1 severance and \$15 reverts. A mantur of gas at \$1.00 could rear be severance and row in reverts, for people meeted to monitor well and care for platform equipment; it's long term employment. Pipeline is mostly automated.	-ame as initial off Shore itt.il uperation.
NAVIGATION	increased waterway traf- fic (crew boat, supply barges); estimated maximum increase: 7 trips per day 11 barge, 6 crew boats), 12-14 trips per day for a b crew boats), 12-14 trips per day for a platform rig (1 barge, 11-13 crew boats).	Not applicable.	Not applicable.	for hydraulic freiging, up to half of waterway blocked by a floating discharge pipe connecting the fredge with either of two upland dredged material stockpile areas; on natrow waterways with one side only stockpile area, the entire channel would be blocked. For draglinedredging, navigation would be affected only in the immediate vicinity of the dredge.	Minimal to rease in waterway traffic: intrips by small craff or crew boat.	increased waterw traffic bargerm workover rig, ba crew boath; esti maximum increase trips per day vi i=3 crew boats

¹No discharges are allowed from platforms or drilling barges with the exception of uncontaminated bilge and ballest water; discharges from marine vessels are allowed in conformance with U.S. Coast Guard regulations.

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Barrell & Barrell						
A DEFENS	(N. AND BARTE RT)	will wine with nightly states and	SAME SAME SAME SAME	- A	ESHANCED RECEIVERS	MATERIA, INJECTION
Consequence of the consequence o	ommer is well amplettic.	Sign 18 will by the	Astronomy acts of consequences of a factor of a consequence of a consequen	osmorias ser vicemppetfoti.	Numerita Well ompletton.	
The figure sessions to session the session of the session session to the session to the session of the session session to the session	Some is Northau perarroll of wells entified from		mate the section of report of a country of the first deposit of a country of a country of and a country of the country of the country of the country of the country of the country of country of the country of country of the country of the country of the country of country of count	ome is Normal peration of Wells and Piperines.	Same as Normal opera- tion of Wells and Pipelines.	Same as Normal Operation of Wells and Pipelines.
en e	No viiit, mal wet, mor area distablet.	No. 10.75, outcomet, sur- ateur districts	A constraint with a constraint of the constraint	N attitional webland (see disturbed.	No additional wetland area disburbed.	No additional wetland area disturbed if existing well converted to material injection; for any new well, the amount of wetland altered would be the same as described for the various drilling alternatives in Table 4-2.
Control of the Contro	attinit, us tesse for abounds of epacety topic ensur- cities ensur- cities ensur-	Mis of Junitable This period of verses Uniqueses	Secretary	his attended it pipeline inscalled, with its Manifar to gathering line distallation.	Some turbidity if welchead platform to installed.	For new wells effects same as for original drilling and pipeline crossing; for use of existing wells turbidity increase trom service vessel propwash.
The second secon	SECTION OF SECULOR SECTIONS	the is well obspletion.	same as Well (smaplet) .	came as Well completion	, Same as Well tomapletion.	Same as Well Completion.
The second secon	Indicate with particles of the control of the control of the control of contr	one as in habbee	dae as turant dige	Possible contamination from infilling new well tee. Inland barget thereige, no dis- ernible impact.	Not applicable.	Contamination same as in- land barge. Over pressure casing rupture may cause loss of solvents enhancement or forma- tion fluids to a fresh- water aquifer.

Smissions from pumps and compressors and associated transportation action of the control of the

TABLE 2-4 SCHMARY OF ENVIRONMENTAL LORDING AND GENERAL ENVIRON EYDROLARBUN PRODUCTION IN THE M. BITTE OF

PARAMETER			SYSTEM CONSTRUCTION HIVE CHOSSIN .	Sakyallas	NIRMAL PERATUR IF WELLS AND PAPELING ALBERTS	Avarrage
MATER JUAN TIY	seliment lemanpension and engine exhaust identifies exhaust identifies into the supply boats and tugs, measupposit, at seliments from son- struction telate! activities.	whiteAstic seriment movement resulting in Some constanged outrients, metals and fumil materials.	Boks. deliment from ranoff. Possitie frilling fluid contempination from exit rode and sediment from associated like.	Penbenthe nerification Stapens on tiring freiging ! trends.	SPIRMS SPIRMS TO SUBJECT TO SUBJE	College of the completed
чурк √ куу	cocal obstruction of urrent by barges/ boats tags in river.	No discernitie impact it pipeline trendes are plugged and ifficer following pipeline installation.	coon, obstruction of urrept by exit rose time.	<pre>.ocal obstruction of .urrent by treige barge and exposed piper line trendes.</pre>	colar "Struction of aftent by rig/barges" beats/tugs in river. Water tire dather is less tavorable in rands than in river cannot.	Some as Normal operation wells and Espeline
MEDIANU providenta	No difficulty affects would liver,	l acre listurbed per jour feet of gathering line Sature (119 acre is freiget, 2000 a re is work area.)	The to and arter than turber to differ this, iffiling tig area learer and hearr par set lown.	To to if acres first turbed to likely reaged materia, toloring crease if formulal treiging is used,	continued less of feducition of atital variues.	No stittpoal wetlangarea (Isturbet)
ARATO EUSYSTEM	continuation of afterts produced by stilling.	sumer ture; sit. from runoff.	Not attricted.	laste of booths, habital distribes per low test of piperine, temperar, loss of boutsis, communities and habital area, commissive tempings,	cittle crise to aquatic consistem, recolonization of free for the area that there is the appropriate and the first the actuality contains and and actually contains and and actually included in the actual forms actually consistent and actual forms actually	Cattliff, increase for any site of the sit
was chia; ce DESP (via.	anitar: Maskes from personnel, stormwater runoil from platforms, tike ani baliast water run boats an barges. No fischarge wasto is stored on barges and taulet for treatment plants for fisposal.	Smiltor, waste from personnel state in builting tames in boulting tames in boured to treatment plant for lisposal.	came is wetlance gathering scatem construction.	same is wettings gathering sistem construction.	commutation waters separated and deep wear, imposted, Samitative waste an processing point treated and tappose, of though septic table sestem of much apply, wasteward for dimental system.	Sale as help sapper
iko M/ADSE	Possible aquiter our tamination from formation from tormation of programming and the subsequent communication extraogramming and the subsequent and tormation waters and affictives to assign toplates formation waters and affictives to assign toplates forming fracturing efforts.	No its ethible impact.	Possible contamination of smallow against in Colloss of frilling limit.	No discernible apact.	Forential for contamination of scale wearable in to previous favours and leaper spaties for the scale was spaties for the scale was spaties for the scale was spaties of scale with the scale was spaties of the scale of scale was spaties of the scale was spaties with the scale was spaties win	milling, with gener teduced activities and the addition of solvents and other formation additives
Alexander Colonia	11. 11. 11. 11. 11. 11. 11. 11. 11. 11.	imissions from back over by mussions of tons per an 196 (1978), and Viking was a 196 (1978).	ard following and in	4	rmissions. In tons jet year	Emissions to mover, compare to explore emissions in the , the life of

	A. A. 1			THE ANALYSIS FOR FIRST BERALLS	B. Ar. T. A. 1996 C. Pres Ara . S.	No FEMALL N
	Explored States of the second	The second secon	and the partition of the second of the secon	a English of Make on Differ positions or positions with a service of the first ending of the first end of th	application of the control of the co	umme oo 114m godi 19 umme oo 114m eeu 19 umme oo 19 umme oo 19
2 12 2 4 4	We are the second of the secon	An extra district of the control of	The second secon	The state of the s	aur applicable	Not applicable.

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when we cannot call to be authorized for each open to the call of the call of

New York Control with the Control with t (b) the targes are allowed from platforms or drilling barges with the exception of uncontaminated bligs and ballest water, the charges from marine reserve are allowed in conformance with 15 unaat mard regulations.

TABLE 2-9 NVIRONMENTAL LOADINGS AND GENERIC EFFECTS OF LOOK IN MOBILE BAY AND MISSISSIPPI SOUND

EKING SYSIEM GO	NN TRAVET CON	N -MAL OPERATION OF WELLS AND PIPELINE		
E YSLEM	WEILAND ECUSYSTEM	BARKIER ISLAND	-ATHERING SYSTEMS	WELL WORKOVER
ecosystems, appension, delease sollowigen orliments. Sin bottom of his seliment tring in the materials.	sediment resuspension and engine exhaust discharges from crew/ supply boats and tugs.	Sediment resuspension from dreiging in surf zone or arill site preparation. Engine exhaust discharges from crew and supply boats. Localized effect from lost drilling mud at exit site for boring method.	So diment resuspension and engine exhaust discharges from crew/ supply boats and lugs.	Sediment resuspension and engine exhaust discharges from crew/ supply boats and tugs.
tion of time of theft at. subjection ation.	channelization of water through pipeline trenches would occur.	Local obstruction of current by vessels.	Local obstruction of current by rig/barge/ boat. Local circu- lition changes in iredge areas.	Local obstruction of currents by barge/boat.
e.	About 1 acre disturbed per 1000 feet of gathering system (1/3 acre for fredged trench, 2/3 acre for work area and fredged material stock pile).	Same as Wetland hoosystem column if trench and cover method used. No effect if boring method used.	tentinue loss of wet- land habitat in canal and slip; beginning of salt marsh recov- ery along gathering system.	No additional wetland effects.
acres of lat per 1000 line during ; turbidity enthic adjacent arma.	Not applicable.	Short term if sturbance of beathic community in trench corridor. Slight effect at drilling site and exit site with boring method.	No new disturbances to benthic communities gathering line corridor would recolonize but uneven bottom after retilling trench could after recolonization.	No additional disturbance if p. :c- tion platform used; for new rig, effects would be same as for drilling.
Compaction.	Same as well Completion.	No discharge from drilling vessel. Discharges allowed by regulation from service vessels.	Formation waters separated at processing plant and/or deep-well injected. Sanitary waste at processing plant treated and itsposed through septic tark system or municipal wastewater treatment system.	Same as Well Completion.
ie impact.	Possible contamination of shallow aquifer due to pipeline failure.	No effect likely from trench and cover method. Possible for some salt water intrusion with boring method.	Possible contamination of aquifers by communication between strata or failure of injection well integrity during injection of produced waters.	Same as exploratory drilling with generally reduced activities on the addition of formation additives.

NAVIGATION	Increased waterway traffic (supply barge, crew boat); estimated maximum increase: 8 trips per day (2 barges, 6 crew boats).	Increased waterway traffic (derrick barge, supply barge, crew boat); estimated maximum increase (at start of installa- tion): 8 to 9 trips	Potential navigation impact while trenching across Intracoastal Waterway; dredged material pile next to pipeline waterway traffic in shallow	Not applicable.
SOCIOECONOMIC CHARACTERISTICS	Personnel increases: 28-51 on board at once. More traffic at staging area. Additional tugs possibly needed; 2-4 jobs per vessel; could use local firm.	10 people to prepare site. 80 workers (40 each shift) needed for installation. Forty more to place equipment. Only a few jobs for locate if regional firm won contract. Traffic increase at staging area and retail purchases by workers to and from job.	120 workers for 5-line system over several months, 60 in each tour; 10 could be local. Traffic increases at staging area, only minor purchases made by commuters. Right-of-way for landfall could result in a revenue influx, other effects are short term.	100 workers for wetland segment of onshore system, 60 could be local. Wages would circulate locally. Traffic would increase at meeting points. All effects are transitory.
SOLID WASTE	Production of small amounts of cuttings and muds, mostly formation fluids with completion additives.	No discernible impact.	No discernible impact.	No discernible impact.
NOISE	Increase in noise levels associated with operation of smaller drilling rig. Noise also from pumps, compressors, lifts and boats. Motorboat: 80 dBA, (avg.) 50 ft. Pumps: 76 dBA, 50 ft. Air compressor: 92-100 dBA.	due to general construc-	Increased noise levels is backhoe equipment, and ma Frenching: 88 dBA (land Large tug, loaded: 54-55 100 ft.	rine trattic. average).
AIR EMISSIONS	Emissions from service vo at rates reduced from ex- generally with a smaller of compressors and pumps Emissions (in tons per vo SO ₂ (.032), CO (1.039), T rig (.096) and NOX (.103)	ploratory drilling and rig. Temporary use .ear): TSP (.U44), RHC, not including	Emissions from drag-lines trenches and support craft Emissions (in tons per ve SO21 (.106), CO (3.462), and NOX (.344).	t. ar): TSP (.146),
PARAMETER	WELL COMPLETION	PLATFORM CONSTRUCTION	GATHERING SYSTEM CO ESTUARINE ECOSYSTEM	NSTRUCTION ETLAND ECOSYSTEM

TABLE 2-9 (Concluded) SY F ENVIRONMENTAL LOADINGS AND GENERIC EFFECTS OF PRODUCTION IN MOBILE BAY AND MISSISSIPPI SOUND

ING SYSTEM O	CONSTRUCTION WETLAND ECOSYSTEM	BARRIER ISLAND	NORMAL E MATION OF WELLS AND PIPELINE SYSTEMS	
om (rag~line support cra c tons per y	es, hydraulic jet	Similar to upland operations (Table 2-18) for trench and cover method. Similar to river crossing (Table 2-4) for boring method.	Emissions from pumps, compress is and flaring. Emissions (in tons jer year): TSP (1.45), SOZ (.506), GO (133.40), THC (3.62) and VOL (199.34).	Emissions from service vehicles and a generally smaller workover rig as compared to exploratory drilling, operating for only 3 to 8 months. Emissions (in tons per (year, not including rig) TSP (.08), SO2 (.063), CO (2.088), THC (.192)
pment, and m ab dBA (land	rom dragline/ arine traffic. average). o dBA (L _{5U}),	Similar to upland operations (Table 2-18) for trench and cover method. Similar to river crossing (lable 2-4 for boring method.	intermittent noise associated with inspection and maintenance. Motorboat: 80 dBA (avg.) 50 ft. Gas venting (blowdown): 80 dBA (with silencer); 140 dBA (without) Helicopter: 70-90 dBA, 1000 ft.	Similar to noise level of well completion slightly increased and of shortened duration
le impact.	No discernible impact.	No discernable impact.	No discernible impact.	Production of drilling waste similar to exploratory drilling, including muds, cements, cuttings, and fracturing chemicals. Drilling fluids: 2,000 bbl/well.
for 5-line several an each ld be local. cases at only ses made Right-indtall in a ix, other short term.	100 workers for wetland segment of onshore system, 60 could be local. Wages would circulate locally. Traffic would increase at meeting points. All effects are transitory.	Similar to upland operations (Table 2-18) for trench and cover method. Similar to river crossing (Table 2-4) for boring method.	Average or 10 people needed to monitor platform equipment. Pipeline is mostly automated, small local crew could be used. Employment is long term. Wages would circulate locally. An Alabama offshore \$30/bbl. of oil could earn \$2.40 in severence and \$7.50 royalty while MMBtu's gas could earn 28% severence and 86% royalty. At same value a Mississippi bbl. of oil could earn \$1.80 severence and \$6 croyalty while a MMBtu of gas could earn 2% severence and 70% royalty in addition to maintenance tax.	Same as initial drilling. 20-36 in a crew, little interaction with adjacent community. Operation would last at least several weeks.
igation trenching pastal iged next atterway allow rench	Not applicable,	Negligible effect.	Few potential effects expected.	Increased waterway traffic same as for routine operations during drilling

TABLE 2-10

SUMMARY OF ENVIRONMENTAL LOADINGS AND SENERCE EFFECTS OF WELL FIELD ABANDONMENT IN MUBILE BAY AND MISSISSIFPI SOUND

farametir	hell Site	Pipelines
water (uality	Seliment distuption from removing facilities. Seliment resuspension from refilling access canals to original contours. Concomitant increase in turbidity and release of nutrients and oxygen-demanding organics. Seliment resuspension in shallow waters and engine exhaust discharges from supply/crew boats.	Seliment disruption from removing above ground structures. Pipelines remain in ground.
Hvdrology	Local obstruction of tidal currents from moored barges and boats. Shell pads remaining following abandonment could alter local navigation and fishing patterns.	Not affected ,
wetland Ecosystem	Canal and slip refilled, recovery of wetland vegetation.	Not afficted.
Aquatte Ecosystem	Short-term furbidity increase with potential effects on meagrass beds; any shell pad hould become substrate for owster larvae.	Not affected.
hastewater Disposal	Sanitury wastes from personnel stored in tunks/batge and hauled to treatment plant for processing and disposal.	flushing fluids collected at processing plant.
orouniwater	Possibility or improperly plugged well providing conduit for formation waters to flow to surface and impact smallow aquifers through infiltration, or loss firectly from abandoned well to freshwater aquifer.	No discernible impact.
Air Emissions	Emissions from service vehicles. Emissions (1 7.003), 502 (.006), CO (.05), HC (.008) and NO	
Yolse	Noise level increase due to general construction activities: Welding: 77 18A (average) Backhoe: 85 dBA, 50 ft.	Same as well sites but only applicable to above ground structures. Pipes remain in ground.
Solii Waste	Deneration of general construction waste. Impact minimal. Disposed of it an approved site.	Same as well site for above ground structures. Pipes remain in ground.
Socioeconomic Characteristics	Permination of severance tares and royalties collected by and distributed from the state. A crew about the same size as in platform installation would remove structure. I depend could dismantle mooring and piles. Backfilling could be necessary in sait marsh, local crew could be used.	Small crew, pussibly local labor, would flush and clean the line.
Navigation	Increased waterway traffic for equipment removal and any restoration efforts; estimated maximum increase: 5 trips per day (2 barges, 3 crew buats); rig or platform removal would remove potential hazard to navigation.	Not affected.

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SPMAND BELLAN EFFORM OF SPILLS OF METRIAL OR RELIASOF TO THE ADSOPTION OF RATIONAL GAS CONTAINING HZS IN MOBILE BAY AND HISSISSIPPL SOUND

ACCIDENT	11/11
Spills Crude Off	fow probability of encountering of the termitions under Bay or Seemal. Large uncontained apill, it one occurred could cause extensive mortality in area receiving oil. Off reaching sections and sait marshes could remain for many veste.
Fuel Oil	Typically 75,00% to 100,000 gallons in arilling rig storage tauks. 40,000 gallons in fuel transport harges. Effects of spiil would be similar to crode oil spiil.
Chemicals	Volumes spilled would be amill. Effects, if any, would be localized because of dilution.
Prilling Fluids	Most material would stak to bottom at atte of spill, lurbid plume of small quantity of material would extend away from after. Effect would depend on location of arcident. Oyster reets would be more sensitive than other locations. Most effects would be localized.
Natural Gas Containing H ₂ S	Most gas would bubble to surface. Sethane would be only sparingly colubbe. Bydropen sulfide could read concentration greater than 0.5 ppm basations to marine organisms—sould be exidered and diluted rainly rapidly. Large crater could form at well site if cashig has been becached below sediment surface. Extensive resuspension of sediments and redeposition arount crater.
Atmospheric Release of Gas Containing H2S	Well blowouts are more likely to occur where they affect oil company personnel. In general, procedures of ministring the likelihood of such an event have been well documented and selecy trainfug is an integral part of oil til personnel. Concentrations usually are less than 100 ppm relatively close to the source. The larged is dependent upon the distance between the location of the accident and the prevailing wind at the time of the accident, regardless of the geographical area.
	H2S is heavier than air, but normally it is released under pressure and mixed with methane which is lighter than air, initially, there would be some vertical distribution of the H2S because of mixing with methane. However uniquely agencies require that the applicant some a "fall-sale" or emergency planning analysis which would preclude major hazards to the public or thora and fauna. Generally, the billet is that concentrations greater than 10.0 ppm over 8 hours should be avoided.
Socioeconomic Characteristicm	Tourism and recreation industries in study stea are vaincrable to significant economic losses from an actionia Hississippi lodging and sport (ishing is worth \$180 million annually. Alabama coast accounts for \$625 million of state tourist industry.
Spills	Columns and provided and an expectation of the contract of the columns of the col
Pipoline Rupture	Could release crude oil (if discovered in replent), nature case containing hydrogen suffide and/or cortoston inhibitor. Effects of crude oil or natural processions came as in the drilling phase. Spith of cortoston would be tive the spill of a heavy crude oil.
Well Workover	Activities are similar to drilling phase. Spiles would be similar to those described for drilling.
Pijeline Rupture Peicring Natural Gas Containing M ₂ S	Studies of various site, essure and duration pipeline ruptures indicate that up to 11 million cubic net of dy gas may be released. Under these conditions, concentrations between 117 and 154 ppm have been calculated at site tances equal to of less than 200 meters from the break.
	H2S is beavier than air, but normally it is released under pressure and mixed with methane waich is lighter than air, nitially, there would be some vertical distribution of the H2S because of mixing with methans. Most regulated that the applicant show a "full safe" or emergency planning analysis which would per long major because to the public or flora and famors, or nevally, the belief is that concentrations. Call play to a consider a should be accused.

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Same as defeling.

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TABLE 2-12

SUMMARY OF ENVIRONMENTAL LOADINGS AND GENERIC EFFECTS OF THE USE OF SEISMIC SURVEY BOATS FOR GEOPHYSICAL EXPLORATION IN ALABAMA AND MISSISSIPPI STATE WATERS OF THE GULF OF MEXICO

Parameter	Effect
Surface Water Resources	Same as for seismic survey boats in Mobile Bay and Mississippi Sound (See Table 5-1).
Aquatic Ecosystem	Slight disturbance flom survey boat and air gun operations.
Wastewater Diaposal	Discharges from the boats with sanitation devices approved by the U.S. Coast Guard are allowed. Effects are localized and short-term. Boats without toilet facilities are not aifected by Coast Guard regulations.
Air Emissions	Emissions from survey vehicles (in tons per year): TSP (.582), SO ₂ (.423), CO (13.776), HC (1.28) and NOX (1.38).
No1 se	No discernible impact. Noise levels similer to ambient marine traffic.
Solid Waste	Not applicable.
Socioeconomic Characteristics	15-16 people needed on 2 vessels; 2-3 could be local hires. Interaction with shore is intermittent; mostly purchases of food, fuel and minor repairs.
Navigation	Potential impact from survey boat towing :wo-mile long seismic cable.

TABLE 2-13

SUPPLIET OF ENVIRONMENTAL LINDLINGS AND CHARGE EFFECTS OF DRILLING IN ALABANA ALP HISSISSIPPL STATE WATRY OF THE CULF OF MEXICO

Parameter	Jackup and Subme	Jackup and Submersible brilling Rig	Fixed Platform	
	Site Preparation	Routing Operation	Site Preparation	Routine Operation
Mater (Audity	Seliment distuption by legs of jack-up rig, pile driving, treaser testing time timber piles. Engine exhaust discientes from rew/supply boats and tugs.	hagine exhaust discharges from crew/supply bonis and tubs.	Schlasen disruption during construction of platform. Creosoner residue from timber piles. Engine-status discharges from crew/supply boats and tugs.	Engine exhaust diachargen from crew/supply boats and tugs.
Hy drolog y	local disturbance of currents around berges and boats.	local disturbance of currents around rigs, barges and boats.	Same as Jack-up.	Same as Jack-up.
Anuntic Ecosystem	Temporary Loss of 0.2 acres of benthic labilitat under factor loss to 0.7 acres under hull or authorishie; louding community habitat created on underwater portions of both cifes; localized turbidity increase during the Arement.	Continued loss of benthic inbitat for drilling priod.	Very small amount of benthic area disturbed by platform legs; invalled short-rerm turbidity increase during platform emplacement; foult; a com- munity habitar created on legs of platform.	Continued less of bentlife tablist period:
Mastewater Disposal	Sanitary w step from person- ne), stormwater runoff from platforms. Ho harmid discharge allowed to state waters. Waste is stored on barges and hundred to treatment plants or to bederat out waters it approved for disposal.	Smilitry whates from person- Same as Jack-up- mel, stormwhater runoff from malatorms, bilge and ballast water from boals and barges, itcliffing and liquids and foraction with two harmful disclurge allower to state whiters! When his stored out bryes and hambout to frequent plants of to bederal Gull waters if approved for disposal.	Same as Ja <k-up.< td=""><td>Same ne Jark-up.</td></k-up.<>	Same ne Jark-up.
Groundant or	Not appilicable.	Possible contamination of treshears squiler by reposure to deliling muds, formation waters or hydrocarbons through improperly sealed wells, cashing ruptures, or natural fractures in squictudes. Perivallety for contamination of shallow smill free due to leachet elfom de to leachet.	No discernible impact.	Same us Jack-up.

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bulsmins from drill rig and support well-les. Includes rig artivity during completion and worknown. Emissions (in tous per year): TNF (14.971), So2 (27.105), (D) (199-195), HC (6.256) and Nox (493.726).

Air Emissions

TABLE 2-13 (continued)

SUMMARY OF ENVIRONMENTAL LUADINGS AND GENERIC EFFECTS OF DRILLING IN ALABAMA AND MISSISSIPPI STATE WATERS OF THE CRUE OF MEXICE

Parameter	Jackup and Subm	Jackup and Submersible Drilling Rig	Fixed Platto	Fixed Plations
	Site Preparation	Routine Operation	Site Preparation	April day Operation
No i se	Moise level increase due to marine traitic and transport by helicopter. Large tug, loaded: 54 dBA (L ₅₀ , 100 tt. Tug along: 47 dBA (L ₅₀), 100 ft. Motorboat: 80 dBA (avg.), 50 ft. Helicopter: 70-90 dBA, 1000 ft.	Increase in noise levels from operation of drilling equipment and support activities: Generic drill rig: 85 dBA, 100 ft.	Same as jack-up, with additional construction equipment.	كاما ، الباء (عه) المار عه)
Solid Waste	No discernible impact. Dredge material from marsh remains on site for reclamation.	Production of spent drilling No discernible impact muds and cuttings (per av. 11,000 ft. well). Liquids: 23,500-184,000 bbl. Cuttings: 6,000-9,000 bbl. Muds: b,000-17,000 bbl. Disposed of at an approved site	g No discernible impact	Same de la
Socioeconomic Characteristics	Up to 12 people needed to bore soil. 4-10 jobs to drive piles for mooring. Extra tug crew could be contracted with 2-4 in crew. Rugging up involves typical drilling complement of 20-36 people.	Self contained operation, 20-36 people on board 24 hours a day; little if any interaction with adjacent economy. Equipment and supplies transported directly from source or shuttled through staging dock; adequate ports available in Mississippi and Alabama.	Existing regional facilities coul, be used to construct platform modules. 50-80 people needed to install structure offshore; only a tew positions filled by locals. Tugs could be local, 2-8 people needed. I month to install a platform.	Same as jackup or submersible drilling rig.
Navigation	Increased waterway traffic (pile nriver barge, supply barge, crew boat); estimated maximum increase: 3 trips per day (1 barge, 2 crew boats); 200 to 250 toot square work area closed to navigation.	Increased waterway traffic (mud and supply barge, crew boat); estimated maximum increase; 5 trips per day (1 supply barge, 1 waste barge, 3 crew boats); con- tinued closure of drilling area to navigation.	increased waterway traffic (pile driver barge, plat- form module barge, crew boat); estimated marinum increase: 4 trips per day (2 barges, 2 crew boats); 300 toot square work area closed to navigation.	Increased water trafflesame as for jackup of submersible; continued closure of drilling area to navigation.

1Mo discharges are allowed from platforms or drilling barges with the exception of uncontaminated bilge and ballast water; discharges from marine vessels are allowed in conformance with U.S. Coast Guard regulations.

TABI.E 2-14

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SUMMARY OF ENVIRONMENTAL LOADINGS AND GENERIC EFFECTS OF HYDROGARBON PRODUCTION IN ALABAMA. And Mississippi state waters of the culf of mexico

Parameter	Well Completion	Platform Construction	Gathering System P	Normal Operations of Wells and Pipeline Gathering System	Well
Mater Quality	Sediment resuspen- sion and engine exhause discharges trom crew datapaty boats and tugs. Reussension of sediments from construction- related Activities.	Sediment disruption during construction of platform. Greesolde residue from fisher piles. Fagine exhaust discharges from crew/supply boats and tugs.	Sediment disruption Sediment resuspension during construction from dredging. Release of platform. Gresole of nutrients and oxygen residue from timber deman' from sediments. Piles. Engine exhaust discharges irom crew/supply	Soffwert resuspension In engine exhaust discharges from crew/ supply boats and tugs.	Sediment resuspension and engine exhaunt discharget from crew/ supply boats and tuss.
HydroLogy	Local obstruction of currents by barge/boat.	Local obstruction of natural currents by barge/bost.	local obstruction of natural current by barge/bost. Local changes in bottom water circulation due to pipeline trenching.	incal obstruction of Local obstruction of natural curnatural curnatural. Local changes barge/hou. in bottom water circulation in dredged areas.	Local obstruction of natural current by barge/howl.
Aquatic Ecnayatem	continued effects as described for drilling it existing it, used; localized turbidity increase if smaller vig used.	Effects the same and for drilling platform (localized turbidity, fouling community habitat created on platform leps).	2 1/2 acres of bentific habitat disturbed per 1000 feet by jot sled method; 4 1/2 acres disturbed per 1000 feet by hydraulic dredging method.	No new disturbances to benthic communities; guinering line corridor would recolonize but uneven bottom after re- filling trench could alter community established.	No additional disturbance il production platform used; for new 15p, effects would be same as tor drilling.
Dispose I	Santary wastes troe personed, stormaster tunoif from platforms, blige and ballast water from boats and barred to state waters in waster in water in the stored on barres and bauled to trefteen plants or to Federal approved for disponal.	Same as Well Completion.	Completion.	Formation waters sepa- rated and deep-well injected. Santfary wastes at processing plant treated and disposed on through acretic tank system or municipal wastewater treatment system.	Same as Well Completion.

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million .

IABLE 2-14 (continued)

SUMMART OF ENVIRONMENTAL LOADINGS AND GENERIC FPECTS OF HTDROCARBON PRODUCTION IN ALABAMA AND MISSISSIPPI STATE WATERS OF THE GULF OF WFXICO

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Parameter	Mell Completion	Platform Construction	Gathering System M. Contraction and	Normal Operations of Wells and Pipeline Cathering System	Well
Groundwater	Possible aquier accordantation from formation additional from true additional fracturing of and subsequent communication of byter carbon and formation uniers and additives by casing ruptures	of applicable.	No discernible impact.	Contemination of hallow aquifer due to pipeline failure and deeper aquifers due to well caming rupture. Contemination of aquifers by communication between strata or failure of sinjection well integrity during lajection of produced waters.	Same as exploratory drilling with generally reduced activities and the addition of formstion additives.
Alf Entenions	Endusions from service vehicles and drill rig at rates reduced from exploratory drilling and generally with a smaller rig. Temporary use of compresses and pumpa. Estasions (in reme pry rest. and including rig.): TEP (.175, SO2 (.127), CO (s.131), MC (.384) and MOX (.414).	initiations from service vehicles and ifili its at rates reduced from ex- ploratory drilling and generally with smaller rig. Tempotary use of com- pressors and pumph. Estasions (in pressors and pumph. Estasions (in TEP (115); SOZ (127), CO (4.13); ac (.304) and NOX (.414).	Entations from drag- lines hydraulic fet treaches and support craft. Estasions (in craft. Estasions (in (.582), SOZ (.423), CO (13.78), RC (1.280) and MOX (1.380).	Entations from pumps, compressors and flating. Entations (in tons per year): TSP (5.665), SCZ (3.57), CO (433.32), MC (9.16) and MOX (149.35).	Emissions from a generally smaller vortwore rig as compared to exploratory drilling, operating for only 3 to 8 months Emissions (in tons per year, not including rig): TSP (.172), SOZ (.127), GC (4.132), KC (.344), and MOX (.414).
	lacrease to noise levels associated with operation of generally smaller drillian .6. Also moise from pumps, compressors, lifes and boats. Hotorbeat: 80 dMs. (avg.), 50 ft. Pumps: 76 dMs. 5) ft. Africompressor: 92-100 dMs. at source.		increase in moise increased noise levels levels due to general from dragins/backhor-construction act—equipment and marker littles. [arg.], [Land average], [Land average], [Land average], [Land average], [Land average], [And averag	intermittent noise- ammoclated with inspec- tion and maintenance, primarily near shore for pipelines. Motorbast: an average of 80 dBM, 50 ft. Can venting (blowdown):	Similar to noise levels of well completion (alightly increased and of shortened duration).

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TABLE 2-14 (concluded)

SUMMARY OF ENVIRONHMENTAL LOADINGS AND CENERIC EFFECTS OF HYDROCARBON PRODUCTION IN ALABAMA AND MISSISSIPPI STATE WATERS OF THE GULF OF MEXICO

Parameter	Well	Platform	Gathering System No	Normal Operations of Wells and Pipeline Gathering System	Well Workover
Solid Waste	Production of small amounts of cuttings and muds, mostly forward in fluids with, completion additives. Disposed of at an approved site.	No discernible impact	1spact	No discernible impact.	Production of drilling waste similar to exploratory drilling, including muds, cements, cuttings, and fracturing chemicals. Drilling fluids: 2,000 bbl/well. Disposed of at an approved site.
Socioeconomic Characteristics	Personnel increase; 28-51 on rig at oace. More traffic at staging area. Additional tugs possibly needed; 2-4 jobs per vessel; local firm could be used.	Personnel increase; 20 people to prepare 38-51 on rig at alte. 80 workers once. More traf- (40 each shift) fic at staging needed for instalates. Additional lation. 40 or more tugs possibly to place equipment. per vessel; local locals if regional firm could be used. firm won contract. Traffic increase at araging srea and retail purchases by workers to and from job. Local tugs could be used.	120 workers for 5-line offshore system, 60 in each tour; 10 could be local. Traffic increases at studing area; only minor purers. Right-of-way for landfall could result in a revenue influx, other effects are short term.	Average of 10 people needed to monitor platform equipment. Pipeline is mostly automated, manil local crew could be used. Employment is long term. Wages would circulate locally. Severance taxes and royalties Shown in Tables 2-4 and 2-9 would be collected and benefit population and governments.	Same as initial drilling. 20-36 in a crew; little interaction with adjacent community. Operation would last at least several weeks.
Mavigation	increased waterway traffic (supply barge, crew boat); estimated maximum increase: 8 trips per day (2 barges, 6 crew boats).	Increased waterway tre fic (derrick barge, supply barge, crew boat); estima- ted maximum increase (at start of plat- form installation): 8 to 9 trips per day (3 barges, 5 to b crew boats).	Potential navigation impact while trenching across intracoastal Waterway; dredged material pile next to pipeline trench in shallow water areas areas acar shore could block waterway traffic until trench is refilled.	Few potential effects expected. 1- 1- 1-	Increased waterway traffic same as for routine operations during drilling.

No discharges are allowed from platforms or drilling barges with the exception of uncontaminated bilge and ballast water; discharges from marine vessels are allowed in conformance with U.S. Cost Gazed regulations.

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TABLE 2-15

S MMARY OF ENVIRONMENTAL LOADINGS AND GENERIC EFFECTS OF WELL FIELD ABANDONMENT IN ALABAMA AND MISSISSIPPI STATE WATERS OF THE GULF OF MEXICO

Parameter	Well Site	Pipelines
Water Quality	Sedment disruption from removing facilities. Sedinart resuspension from thilling access canals to original contours. Concomitant increase in turbidity and release of nutrients and oxygen-demanding organics. Sediment resuspension in shallow waters and engine exhaust discharges from supply/crew boats.	Possible sediment disruption from removing above ground structures. Pipelines remain in ground.
Hydrology	Local obstruction of tidal currents from moored barges and boats. Remaining shell pads could alter local navigation and fishing patterns.	Not affected.
Aquatic Ecosystem	Localized, short-term tur- bidity increase and benthic disturbance when production platform removed. Rapid recovery of small area dis- turbed. Remaining pad material would serve as substrate for oysters.	Pipeline abandoned in place. No environmental disturbance.
Wastewater Disposal	Sanitary wastes from per- sonnel stored in tanks/ barge and hauled to shore for processing and disposal or treated and discharged to Federal waters.	Flushing fluids collected at processing plant.

TABLE 2-15 (Concluded)

SUMMARY OF ENVIRONMENTAL CHADENCE THE COMERCIAL FRONTS WELL FIELD ABAND PARKET IN ALA AMA AND MISS COTTENDED FOR WASHING THE HEALTH OF MEXICO.

Parameter	Well Site	Ptpeitnes
rroun1watet	Possibility of improperly plugged well providing conduit in formation waters to flow to surface and impact shallow aquifers through infiltration, or loss directly from abandoned well to freshwater aquifer.	No distermible impact.
Air Emissions	Emissions from service vehicle per year): TSP (.087), SO ² (.0 (.192) and NOX (.207).	es. Emissions (in tons (63), CO (2.07), HC
Noise	Noise level increase due to general construction activities: Welding: 77 dBA (average). Backhoe: 85 dBA, 50 ft.	Same as well sites but only applicable to above ground structures. Pipes remain in ground.
Solid Waste	Generation of general construction waste. Impact minimal. Disposed of at an approved site.	Same as well site for above ground struc- tures. Pipes remain in ground.
Socioeconomic Characteristics	Termination of severance taxes collected by and distributed from the state. Crew size to remove platform about the same as in installation.	A amall crew, possibly local labor, would flush and clean the line. Line abandoned in place.
Nevigation	Increased waterway traffic for equipment removal; estimated maximum increase: 5 trips per day (2 barges, 3 crew boars).	Not affected.

TABL 2 IN

AUMMARY OF BAVIROMENTAL LOADINGS AND GARRO FREET, OF SPILLS OF MATERY. OF PELBASET FOR A MOSPORAL OF MATERY OF LAS CONTAINING HZ IN ALAMAM AND MOSSIPPLESTEE WATER OF THE GUIF OF MOSPORAL

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	of encumnitating oil in formations under state waters of the Gull of the countral would depend on wind direction, sea state, if one occurred, would depend on wind direction, sea state, during winter and entity spring hybering season could cause season of the transported onto beaches.
Fuel 11	Typically 75,000 to 100,000 gallons in drilling rig storage canks. 40,000 gallons in fuel fransport barges. Effects of spill would be similar to crude oil spill.
Chemicars	Volumes spilled would be small. Effects would be negligible because of dilution.
Drilling Made	Most material would stak to bottom at apill afte. Turbid plame of mast in quantity of material would extend away trom site. Material would be spread out by storm events. Effects would be localized. Otenn disposal of muds and fluids allowed trum ties bevond 3 mile limit of state waters.
Matural Con Gentaleing H ₂ S	Most gas w. 1d bubble to surface. Rapid dilution would minimize effects. Large crater could form at well site if casing has been breached below actiment surface. Extensive resuspension of sediments and redeposition stound crater.
Atmospheric Release of Gas Containing H2S	Same as Mobile Ray and Mississippi Sound.
Sorioecumomic Characteristics	louries and recreation industries could be advertely aftertel. Alabies coast accounts for \$615 willion error amountly on couries. Ledging and sports fishing in Mississippi is worth \$183 million per annus. Economic losses would be likely if an accident occurred.
Spills hell Servicing	Solvents and materials used in small volumes, Piletts unlikely because of rapid (fluring)
. Ip. 1 fne Rupture	Could release crude oil (if discovered in region), natural gas containing hydrogen suifide subject corresion inhibitor. Effects of release of crude oil of natural gas would be the case as in the drilling chase. Spill of corresion inhibitor would be like the spill of a heavy crude oil.
Well Horkover	Activities are similar to drilling phase. Spills would be similar to those described for drilling.

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Same as Mobile Ray and Mississippi Sound.

Fipeline Rupture Releasing Matural Gam Containing M23

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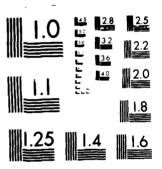
EXPLORATION AND PRODUCTION OF HYDROCARBON RESOURCES IN COASTAL ALABAMA AND MISSISSIPPI EXECUTIVE SUMMARY(U)

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TABLE 2-17
SUMMARY OF ENVIRONMMENTAL LOADINGS AND GENERIC EFFECTS OF DRILLING FROM AN UPLAND SITE IN COASTAL ALABAMA AND MISSISSIPPI

Parameter	Site Preparation	Routine Operations
Water Quality and Hydrology	Rumoff from spoil piles, drilling rigs and trenches may include sediment, waste fuels, waste oils chemicals.	
Upland Ecosystems	1/2 acre cleared per 1000 feet of access road; l acre cleared for drilling activities; in both areas, wildlife habitat would be lost for the life of the project.	No additional area disturbed.
Wastewater Disposal	Sanitary wastes would be atored, treated and discharged below ground, treated on-site and discharged to the nearest water body, or hauled to a treatment plant for tree:ment and disposal.	Drilling muds/fluids may be disposed of in lagoons or de- watered and transported to a landfill; in either case, liquid would need to be dis- charged to a water body or to a treatment plant.
Groundwater	Alteration of near surface hydrological process from earth moving activities.	Possible contamination of freshwater squifer by exposure to drilling muds, formation waters or hydrocarbons through improperly sealed wells, casing ruptures, or natural fractures in squicludes. Possible contamination of shallow aquifers due to use of on-site mud storage pits, or infiltration of brine for emergency brine storage pits if liner is
		breached.
Air Emissions	Emissions from drilling equipment, d construction activities and transporduring completion and workover. Emi TSP (13.47), SO2 (26.14), CO (163.21	tation. Includes rig activities seions (in tons per year):
Noise	Increase in noise levels due to land clearing activities and transportation. Dozer: 80 dBA, 30 ft. Chain saw: 83 dBA (avg.), 50 ft. Medium-heavy duty trucks: 84 dBA, 50 ft.	Increase in noise levels from operation of drilling equipment and support activities: Generic drill rig: 85 dBA, 100 ft. (level rig may be higher due to radiator fan noise).
Golid Waste	Biomass from land clearing disposed of on site or at an approved landfill.	Production of spent drilling muds and cuttings (per av. 21,000 ft. well): Liquids: 23,500-184,000 bbl. Cuttings: 6,000-9,000 bbl. Muds: 6,000-17,000 bbl. Disposed of at an approved site
Socioeconomic Characturistics	Land-based oil and gas infra- structure in region is currently developed, not a new activity. 15-30 workers to clear access and site, some local nires. 15-30 in all drilling shifts rig up. 8-16 truck drivers and helpers to transport rig. Traffic incresses at access and site.	8-10 people for each of 3 8-hour shifts, fourth craw fills in as needed. Workers within a hundred miles would be likely to commute daily or stay during the week, not move. Small retail pur- chases made by commuters, residents' wages circulated locally.

PARAMETER	CPLAND WELL COMPLETION	GATHERING SYSTEM	FACILITY CONSTRUCTION OIL TREATMENT FACILITY	GAS TREATMENT FACILITY	UPLAND CATHERING SYSTEM	TREATM
WATER JUALITY, HYDROLOGY AND WASTEWATER DISPUSAL	Sanitary wastes, runoif from site, production waters and mud liquis from trilling, wastes stored onsite or piped to treatment plant for processing and disposal.	Numoii from trenthes and spoil piles. Nanitary wastes from personnel stored omsire and Nauled to treatment plant for processing and disposal.	site during construction. Sanitary wastes from	Sediment functions size during construction. Natitary wastes from personnel store; one-size and hauled to treatment plant for processing and disposal.	Not applicable.	Sanita duced off, c boiler may be suria- treatm NPDES into 1 charge sewer dispose unavoi occur.
UPLAND ECOSYSTEM	No additional area disturbed.	I to I 3/4 acres cleared per 1000 teet of rightror-wa, and all wildlife habitat lost within this area.	Hil treatment: 1) to 20 acres cleared and Wildlife nabitat lost.	bas treatment: 30 to 30 acres cleared (additional 20 acres could be needed for storage of recovered sulfur).	negrowth of grasses and small shrubs. Continued maintenance would not allow re- growth of thees and large large woods shrubs.	Contin biolog produc struct paved life o
GROUNDWATER	Possible aquifer con- tamination from forma- tion additives due to unintentional irractur- ing of and subsequent communication through aquicludes. Introduc- tion of hvirocatbons and formation waters and addi- tives by casing ruptures during fracturing efforts		No discernible impact.	No discethible impact.	Accidents at treatment facilities and suring transportation of product.	Acrite facili transp tuct.
	Emissions from service weblicles and dril rig at fates reduced from exploratory drilling and generally with a smaller rig. Temporary use of compressors and pumps. Emissions (in tons per year, not including rig) ISP (.044), 502 (.032), .00 (1.039), Th((.096), and NOX (.103).	Emissions from general cor Emissions (in tons per ve. (,,))), and NOX (,,)44).	istruction equipment. ir): TSP (.146), SO2 : ,10e	o), CO (J.46∠), INC	Emissions from pumps, comprehences and flaring. Emissions (in tons per version), 100 (207.40), Inc. 149,341.	r /: 15
	operation of generally madler drilling rig. Also noise from pumps, compressors, lifts, and vehicles.	Increased noise levels fro activities. Dozer: 80 dBA, 30 ft. Paver: 99 dBA, 50 ft. Concrete mixer: 85 dBA, 5 Pheumatic toois: 86 dBA, Land clearing: 75 dBA, (av Medium-heavy duty truck: 8	U ft. oU ft. erage).	tion and transportation	Intermittent noise association; maintenance of pipelin treatment tacilities/servi portation of product by trelate stack: 81-96 dBA, 2 cenerator: 90 dBA, 6 ft. Pump: 80-90 dBA, operator All Compressor: 90-100 dB Medium ineavo-duty truck: Large tug with barge at do	es, op ce bas uck, U ft, 's pos A4 1BA ok; b

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TABLE 2-18 NVIN - MOS A - ADINOS AND GENERIC SEFECTS FROM SYDROCARBON PRODUCTION ACTIVITIES SSIN. IN PLANDS IN GOASTAL AGABAMA AND MISSISSIPEL

		FRATION	CPLAND WELL	F.AN. ENHANCED		RESURERCE TRANSPORT
FACTL	FLAND LALBERTH SYSTEM	TREATMENT FACILITY	WURK /VER	REC. VERT FACILITIES	SERVICE BASES	MARKET
it tro- control to was to stor- pulet - it for a disp	Not apply ables	Sanitars wastes, pro- fuced brines, site fun- off, cooling water, foiler water. Wastes may be lischarged to surface waters after treatment required by MPDES permit; injected into deep wells, or dis- charged to a sanitary sewer for treatment and disposa, at a municipal treatment plant. Small, unavoidable spills would occur.	Sanitary Wastes from personnel, runoff from site production waters and most liquids. Wastes stored onesite or pipel to treatment plant for processing an illsposal. Small, unavoilable spills would occur.	Namit it. Wastes from personner, runoit from site production waters and mot liquits, wastes store: in-miste or piped to treatment plant for processing and disposal small inavoidable spills would occur.	Altered runoii characteristics wastewaters and unavoidable, small spiils are genetated.	hmall, unavoidable splies would occur.
1 30 costr. ksre- let for covere	regreath of grasses out small, shrubs; continued maintenance emply not allow for greath of these and large large woods shrubs;	continued loss biological productivity under structures and payed areas for life of project.	No additional area disturbed.	toss littl Wildlife satisfat lost for spew will It acres and new pipeline it is 13/4 acres per list feet of lite. Waterial insections additional 3/4 acre may be leaded to store material to be intended.	No effect of existing facilities used; expansion or creation of new facilities could affect 20 to 100 acres depending on expected activity.	Pipeline: 1 to 1 3/4 acres cleared per 1000 feet of line, loss of wildlife habitat.
ie Impa	As pleats at freatment to parties and surfac- tion sportations of protect.	As lights at treatment to cattles and during transportation of pre- luct.	same as explorators stilling with generalli- reduced activities and the addition of forma- rion additives.	intamination from criffing new well. See pressure and/or see topture may lause loss of enhancement or cormat, in fluids to a treshwater aquifer.	No discernible impact.	No discernible impact.
. 111	ministons from pumps, ong etc. les int flaring, imissions in tons per vea Elli, or 207,467, th	it): ISP (2.145), Sec	hmissions from service weblices and a generally smaller workness till as compared to explorator. Irrilling operating for only 3 to 6 months, maissions in tons per year, not in counting fig.: (SP 1.087), SP2 5.083), for .2.088), ThC -1927, and NOX2081.	mmissions from pumps this compressors and issociated transportation is tivities, issumity no new wells are linced; massions in tons percentic TSP (1.97), 502 (1.93), to (4.674), IRC (1.93), and NOX (1.453).		
aportat.ob	Intermittent moise associani maintenance of pipelin frestderic facilities/service portation of product by tr Fiare stack: 0.750 dBA, 0 fr. Fung: 0.70 dBA, operator Air Compressor: 0.010 dB Medium heavendurs truck: Large tug with batge at ac-	res, operation of [ce bases and trans- uck, U ft, 'A position, Ma BAA, 30 ft, owl bd 18A con',	Similar to increased notes from well-om- pletion, slightly inc- creased and generally of a stortened juration of 5 to 8 weeks).	Increased noise levels for the use of compressors and pumps and service vehicles. Pumpi fo 18A, 50 ft. Air Compressor: 92-100 df Wedium Neasy-duty truck: 85 f8A, 50 ft. No pumpi compressor noise if pressurizel gas is recycled via pipes; from treatment plant.	-	rations of

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2-41

TABLE 2-18 (Concluded)
SUMMARY OF ENVIRONMENTAL DUADINGS AND GENERIC EFFECIS FROM HYDROGARBON PRODUC
OF CORRENO ON UPLANDS IN COASTAL ALABAMA AND MISSISSIPE.

DADAM TEL	UPLAND		FACILITY CONSTRUCTION		NORMAL U	PETATION
PARAMETER	WELL COMPLETION	SATHERING SYSTEM	OIL TREATMENT PACILITY	GAS TREATMENT FACILITY	UPLAND GATHERING SYSTEM	TREATMENT FACILITY
SOLID MASEE	Production of small amounts of cuttings and muds, mostly formation fluids with completion additives. Disposed of at an approved site.	General construction waste.	General construction waste.	weneral construction waste.	No discernible impact.	Small volumes of seri- ment material produced from oil treatment tanks and piping. For a 225 MMCP gas processing plant, one barrel per day of sulfinol process waste Three to 3 tons/wear of miscellaneous goilt waste produced. Some of which may be clas- sified hazerdous fi produced in sufficient quantities and our reciained. Small volumes of indus trial waste produced a service bases.
SULTOECONOMIC HARACTERISTICS	One of busiest phases, workers on site at once would increase, as would traffic. Landbased service industry in region, so increases would be in line with established practices. Completion indicates that resources are available for taxation and royalties.	10 to 100 jobs. 352 to bul could be local intes. Employment is transitory. Iratilic increases at meeting points. Potential local purchases of materials. Land acquisition could result in monetary influx.	o to 15 acres for plant; 50 acres could be acquired. Employment for 10 to 150; more than 1/2 could be local nires. Wages circulated and taxed. Possible inmigration; larger communities could absorb addition with little if any stress on resources. Traffic increases at and around site.	20 to 75 acres acquired, more if larger buffer is needed. 25 to 550 workers; most could be local hires. All effects same as for 11 processing plant.	Operation highly auto- mated; small workforce needed for monitoring and right-of-way maintenance.	Permanent employment for 15-35 people, wages locally circumated and taxes; as shown in Tables 2-4 and 2-9.

TABLE 2-16 (concluded)

KINMENTAL: ADDNOS AND GENERIC EFFICES FROM HYDROLARBON PRODUCTION ACTIVITIE

CONKING ON (FLANDS IN GRASIAL ALABAMA AND MISSISSIPE)

	NORMAL OPERATION					RESUURCE TRANSPORT	
FACILITY	THAND GATHERING SYSTEM	TREATMENT FACILITY	WURKUVEK	ALL VER FACILITIES	SERVICE BASES	MARKET	
u-tirm	Vociscernible impact.	Small volumes of setiment material produced from oil treatment tabes and piping. For a 225 MMCFD gas processing plant, one barrel per day of sultinol process Maste. Three to 5 tons/year of miscellaneous solid waste produced. Some of which may be classified and are to be sufficient quantities and not recinimed. Small volumes of industrial waste produced at service bases.	Production of Irilling waste similar to exploratory irilling, including musts, cements, cuttings, and tracturing chemicals. Drilling fluins: 2,000 bbl/well. Disposed of at an approved site.	No contible impact, assuming no new wells are relied.	Sonstruction debris would be major form of solid waste during construction. Wastes from operations would include dumnage, b.5 lbs. of garbage per person per day.	No itscernible impact.	
to it its its its its its its its its its	operation highly automate; small workformer needed for monitoring and right-of-way maintenance.	Permanent employment for 15-35 people. Wages locally circu- lated and taxed; as shown in Tables 2-9 and 2-9.	Same as initial urilling operations.	it new pipeline needed same is initial pipe- line. If new wells are needed same as initial riving. Could expand treatment lacility then small construction work- lore needed, friects short lived.	5 to 10 acres most used for open storage. Improvements could require workforce of 20 to 90. Space usually rented. 2 to over 50 people needed during operation; many local hires. Wages and taxes circulated locally.	if new pipeline is needed, employment opportunities would be the same as initial gathering system.	

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TABLE 2-19

SUBMARY ENVIRONMENTS: E.A.D. 4D GERIC EFFECTS OF ABANDOMHENT OF UPLAND HYDROCARBON DROLLENG AND THE OUTTION OF THE LITTLES IN COASTAL ALABAMA AND MISSISSIPPI

Parameter	⊍pian: Well Site	Pipelin es	Treatment Facilities	Service Bases
Sunface Pater Paniting	outlane runouf from secommissioning activities and waste chemicals from erosion and residue; cremical/product contamination.	Pipelines remain in ground. Surface run- off and waste hemicals from decommissioning activities associated with above ground facilities.	Surface runoff and waste c activities including erosi product contamination.	hemicals from decommissionin on and residual chemical
rlavi Pob systems	After equipment tempical, area could be regarded and resected, as fetermines by randowner.	Suruce use of area setermines by landowner.	Future use of area determined by landowner	Area would probably remain as a commercial or industrial area
eustemeter 20 gonal	manicary wastrs firs per- sonnel treated and fis- charged to site or smalled to treatment plant for crocessing and displace.	Flushing fluids collected, treated, and disposed of at processing facility.	Sanitary wastes from personnel may be treated and dischaged to surface waters or hauled or piped to municipal treatment plant for treatment and and disposal. Pipeline flushing fluids either treated and disposed of to deep-well injection or surface waters, or hauled or piped to industrial treatment plant for treatment plant for treatment plant for treatment ment and disposal.	
Sroundwater	Possibility of improperly plugged well provide conduit for format', waters to flow to surface and impact shallow aquifers through infiltration, or loss directly from abandoned well to freshwater aquife:	No discernible impact.	No discernible impact.	No discernible impat.
Air Emissions	Emissions from service vehicled NOX (.004).	les. Emissions (in tons pe	r year): TSP (.003), SO2 (.006), CO (.05), HC (.008)
Noise	Noise level increase simi- lar to general construction activities: Welding: 77 dBA (average) Backhoe: 85 dBA, 50 ft.	Same as well sites but only applicable to above ground struc- tures. Pipes remain in ground.	Similar to well site, (more activity) if facility is not sold in place.	Similer to well site if facility is not sold in place.
Solid Waste	Generation of general con- struction waste. Impact minimal. Disposed of at an approved site.	Same as well site for above ground structures. Pipes remain in ground.	Similar to well sice (more activity) if facility is not sold in place.	Similar to well size if facility is not sold in place.
Socio- economic Charac- teristics	Minimum 5-7 days to move rig off site. At least 26 people employed. Traf- fic would increase. Ces- action of Severance tax and royelties to state and/or private parties.	Small crew needed to flush pipes; no appreciable effects.	Facilities could be sold for similar use, converted to another industrial use, or be removed. New use could be beneficial for local employment.	Could be converted and used in marine trans- portation, commercial or sport fishing, fish or wood processing or industr al park. Substituting business may or may not affect local employment, personal income taxes and local resources.

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PARAMETER	MOBILE DELTA	MOBILE BAY	MISSISSIPPI SUUNU
WATER QUALITY	Cumulative effects of turbidity unlikely because of temporal and spacial separation of activities. All wastewaters and solid wastes collected and transported to land for disposal.	Cumulative effects of turbidity unlikely because of temporal and spacial separation of activities. All wastewaters and solid wastes collected and transported to land for disposal.	cumulative effects of turbidity unit because of temporal and spatial sepa of activities. All wastewaters and wastes collected and transported to for disposal.
HYDROLOGY	No cumulative effect if separate waterways are not connected.	No cumulative effects	No cumulative effects.
GROUNDWATER			
WASTEWATER DISPOSAL	All sanitary wastewater from well sites collected and transported to shore for disposal. Volume generated would be 17, 19 and 24 million galions for the low, moderate and high scenarios; small volume compared to amount generated in surrounding region.	All sanitary and wastewater from well sites collected and transported to shore for disposal. Volume generated would be 180, 230 and 170 million gallons for the low, moderate and high scenarios; small volume compared to amount generated in surrounding region.	All sanitary and wastewater from we. collected and transported to shore: disposal. Volume generated would be and 60 million gallons for the low, and high scenarios; small volume com to amount generated in surrounding:
NOISE	Noise levels generated by multiple drilling rigs spaced a minimum distance apart are not appreciably noisier than one drilling rig relative to an equidistant sensitive receptor (Mobile River Delta) or an oit-shore receptor (Mobile Bay, Mississippi Sound, Gulf of Mexico). Maximum cumulative noise levels for drilling rig operations under the worst case would be 65 to 70 dBA.	Maximum cumulative noise levels for drilling rig construction and normal operations under the worst case would be 58 to 59 dBA.	Maximum cumulative noise levels for drilling rig construction and normal operations under the worst case would be 58 to 59 dEA.
ETLAND COSYSTEMS	Total forested Delta area altered would range from 205 to 510 acres depending on the combination of drilling alternative and scenario; area required for pipeline right-of-way would be similar for all scenarios and would be a significant portion of total area aftected in all scenarios, decreasing from 255 acres for the low scenario to 185 acres for the high scenario; area affected by drilling would vary greatly depending on the drilling alternative used; platforms and trestle roads would only alter 15 to 30 acres, canals and slips would alter 155 to 325 acres. Use of canals and slips would eliminate primary production, detritus export and the use of the area for spawning and feeding; area altered by platforms, trestle roads and pipeline rightsof-way would have reduced primary production but the area would still be available as feeding and spawning habitat. Altered area would be less than 1 percent of forested Delta area but would be an incremental increase to the 1.7 percent already altered (excluding logging). Total non-forested Delta area altered would range from 11 to 50 acres, much of it pipeline right-of-way; pipeline area would be disturbed only temporarily since careful restoration would allow recovery of original vegetation; use of platforms and trestle roads would alter about 1 acre; canals and slips would slee an incremental addition to the already large loss of non-forested Delta area (about 25 percent) that has already occurred.	Wetlands would probably not be disturbed under any scenario because adequate pipeline landfalls exist that would not require crossing wetlands; rorested wetlands would be crossed between Weeks Bay and the Bon Secour River, a likely maximum of 3 corridors would disturb 1 percent of the wetland area.	unly 3 wetland areas could not be really directional drilling; limited has but resource estimated for region and low probability of crilling these are Most pipelines in the region would onshore between Pascagouia and the assland Bridge; careful planning of could minimize or avoid crossing wet.

	MISSISSIPPI SOUND	STATE WATERS OF THE GULF OF MEXICO	UPLAND
* 1 ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	umulative effects of turbidity unlikely because of temporal and spacial separation of activities. All wastewaters and solf: wastes collected and transported to land for disposal.	cumulative effects of turbidity unlikely because of temporal and spacial separa- tion of activities. All wastewaters and solid wastes collected and transported to land for disposal.	Not applicable.
	No sumulative effects.	No cumulative effect.	Not applicable.
sites r dist . Cho moderate ared gion.	Ail sanitary and wastewater from well sites collected and transported to shore for fisposar. Volume generated would be 30, 60 and 60 million gailons for the low, moderate and high scenarios; small volume compared to amount generate. In surrounding region.	collected and transported to shore for disposal. Volume generated would be	
	Maximum cumulative noise levels for irilling rig construction and normal operations under the worst case would be 58 to 59 dBA.	Maximum cumulative noise levels for drilling construction and normal operations under the worst case would be 48 dBA.	The USLPA recommended values for residential/institutional areas are 55 to 65 dBA ($L_{\rm dn}$). However, those activities that are continuous (e.g., drilling) would produce a noise level higher ($L_{\rm dn}$) than the presented calculated instantaneous estimates. Other factors than can increase or decrease estimates include vegetation, atmospheric inversions, wind and ambient noise levels.
0.1	only 3 wetland areas could not be reached by directional drilling; limited hydrocarbon resource estimated for region gives low probability of drilling these areas. Most pipelines in the region would come onshore between Pascagoula and the Dauphin Island Britge; careful planning of routes could minimize or avoid crossing wetlands.	Not applicable.	Not applicable.

PARAMETER	MOBILE DELTA	MoBILC BAY	MISSISSIPP. 1. NO
AQUATIC ECOSYSTEMS	Little cumulative affect in main flow channels because of likely spacial and temporal separation of dredging activities for canal construction or pipeline river crossings if these methods are used; virtually no effect it boring method used for pipeline river crossings and platform drilling methods are employed. Dredging activities in shallow bays of southern Delta would occur in an area of importance as a nursery for many aquatic organisms and as waterfowl overwintering ground. Aquatic habitat created in canals and slips would add only slightly to the 30,000 acres of aquatic habitat in the Delta. The value of this habitat is not documented but could be low if low dissolved oxygen concentrations occur.	Main altering activity would be pipeline construction during years 6 to 10 or 11. Area affected by drilling sites would be very small for any drilling alternative or scenarios. Under the high and moderate scenarios, between 2300 to 2500 acres would be newly disturbed or recovering from disturbance in years 9 and 10, which is about 1 percent of the bay area; some affect on bay secondary productivity could result for that period it the disturbed area is concentrated in one portion of the bay. Dredging for well site access would probably be necessary in the shallow northern portion of the bay near the Battleship Parkway; any disturbance there would occur in an area of importance as a nursery for many species and as a waterfowl overwintering ground.	Very little acti.ftv would occur scenario; much of wont would occur occur in lor 2 years, our left or pipelines in or near seagrass or ovster reels, no such kuller. Alahama waters, but most seagrass are within 1/2 mile of sour, wordfilling sites are extuner. An bance by dredging in the sour, word from the state of Fortersville Bay and near the Island Bridge could affect soring grounds and oyster bottoms.
COMMERCIAL FISHERIES	Minimal impacts expected.	Direct loss of 10 to 15 acres to any fishing; trawling operations restricted on another 50 to 100 acres; bottom irregularities or mud lumps following gathering line installation could restrict fishing boat movements or trawling activities.	Direct loss of 1 1/2 to 5 4cres fishing; trawling operations rest on another 8 to 35 acres; purse operations potentially restricted 160 acres near rig or platform; firegularities or mud lumps follogathering line installation coursestrict fishing boat movements trawling activities.
IAV1GATION	Estimated potential maximums of daily waterway traffic increases 3 to 6 barges, 15 to 30 crew boats/supply boats.	Estimated potential maximums of daily waterway traffic increases: 30 to 45 barges, 55 to 95 crew boats/supply boats; 12 to 15 platforms added as permanent structures in the Bay.	hstimated potential maximums of a waterway traffic increases: 5 to barges, 10 to 40 crew boats/supp. boats; 2 to 5 platforms added as permanent structures in the Soun:
CULTURAL RESOURCES	Prior to issuing any permit for major development activities, potential impacts to known or suspected cultural resources must be resolved.	Prior to issuing any permit for major development activities, potential impacts to known or suspected cultural resources must be resolved.	Prior to issuing any permit for m development activities, potential to known or suspected cultural remust be resolved.

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TABLE 2-20 (conclude): CMMART OF ENVIRONMENTAL EFFECTS OF RESOURCE DEVELORMENT OF NAFI

	MISSISSIPPI SCOND	All while to to dub of MEXICO	CPLAND
personal formation of the control of	Very little activity would occur under an scenario; much of what would occur may be concentrated in mastern portions of the sound. Most pi, cline construction would occur in 1 or 2 years. Suidelines in Mississippi do not allow drilling sites or pipelines in or near seagrass beds or ovster reets; no such guidelines in A. dhama waters, but most seagrass beds are within i/2 mile of shore, within which iffling sites are excluded. Any disturbance by diedging in the shallow areas it fortersville Bay and near the Daupnin islam; Brilge could affect shrimp nursery arounds and ovster bottoms.	to pipe, see	Not applicable
tw ivter ing	Direct loss of 1 1/2 to 5 acres to any fishing; trawling operations restricted on another 8 to 35 acres; purse seining operations potentially restricted on 160 acres near rig or platform; bottom irregularities or mud lumps following gathering line installation couli restrict fishing boat movements or trawling activities.	Direct loss of 2 to 8 acres to any fishing, trawling operations restricted on another 10 to 35 acres; purse seining operations potentially restricted on 160 acres near rig or platform.	Not applicable.
ilv 45 boats; ent	bstimated potential maximums of daily waterwa, traffic increases: 5 to 20 barges, 10 to 40 frew boats/supply boats; 2 to 5 platforms added as permanent structures in the Sound.	hstimated potential maximums of daily waterway traffic increases: 5 to 25 barges, 15 to 50 crew boats/supply toats; 3 to 8 platforms added as permanent structures in the state waters.	Not applicable.
jor de- pacts to ces must	Prior to issuing any permit for major development activities, potential impacts to known or suspected cultural resources must be resolved.	Prior to issuing any permit for major development activities, potential impacts to known or suspected cultural resources must be resolved.	Prior to issuing any permit for major development activities, potential impacts to known or suspected cultural resources must be resolved; some secondary development (e.g., upgrading or building a service could potentially affect cultural resources in the area of development. Prior to issuing any project permit, conflicts on potential impacts to known or suspected cultural resources must be resolved.

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Air Emissions

There are greater total emissions from unit offshore operations due to added support and supply requirements, difference is small from Motile River Delta to Alabama OCS, less than 10 percett.

The scenarios reveal that peak level platform activities produce downwind concentrations of greater than de minimis levels (NOX, possible SO2 and ISP). This was true in all project generalized areas.

Peak lengt companism processing plant conality also produces downwind to distractions greater transde afnimic "crebs one orbit." This was true in all project glographical areas.

lear level platform and processing , set activity reach or exceed significant emission rates (NOX, CO. 802).

Peak level platform and processing plant emissions will consume 50 percent of Class II increment for 502 out to 7 km distance.

Long-term modeling reveals few excesses of air quality standards; these excesses are most likely associated with potential processing plants (502) (close in) and close to platform (within 5-10 km) emission centers (only close in to activity), but this does not include ambient. Background suggests possible potential problems where near non-attainment exists and where 50 percent of Class II increments are now committed. Continuence of proper PSD reviews of new sources will minimize this impact.

TAB1Y 2-21 (Contf: .ei)

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LIMMARY OF ENVIRONMENTAL PERFECTS OF A TIVITIES ANALIZED ON A REGION-WIDE BASIS FOR THE RESERVED BYVELOPMENT SCHARLIS

ARAMETER	STEEDT.
Attracted one Treatform	lass i areas are not affected; they are too distinct from the accivity. With accusar amongs to remember the accivity with accusar amongs of the accusation and the accivity have to be made in activities in and near already burlened areas by policiant).
∋roundwater	Multiple in: musions of a single aquifer nose the greatest threat to a groundwater contamination by chloride from brine disposal.
	Brine production for the highest resource levelopment scenario (yobile River Belts and Mubile Bay, 927.5 x 10 ⁰ bbl) can be disposed of in approximately three quare miles of the Wilcox Sand formation.
	Possible long-term contamination of fresh water aqui- fiers due to the characteristically slow discharge of pollutants by natural flushing.
Solid and Hazardons Waste	Onshere dispess, of drilling muds, fluids and outtings produces by multiple exploration and well workover drilling operations. The high resource development scenario for the entire project area will produce approximately 160,000 cubic vards of material in the most active year. A single permitted mud disposal operation in Mississippi is known to have an on-site capacity to dispose of approximately 1.38 x x00 cubic yards of material. Production of hazardous waste sludges from multiple gas treatment plants would result. Less than two barrels per day of semisolii hazardous waste would be produced by the high resource gevelopment scenario.

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MILLACTNO MEASURES RELEVANT DESCRIBING ON SEVELAMMENT IN CONSTAL ALABAMA AND MESSISSIEPT

)		INDI TAY PRACTIVE:	OTHER POLENTIAL MITIGATION MEANGRES
	contraral resources survey required for gards etitities prior to start of artivities (includes normal survey recharques on land and multi-sensor recharques underwater).		Require cultural resources survey for all por tons of land-based support activity.
SING TO AND A COMPANY OF THE COMPANY	Northmed and regional accident contingency, heperate spill prevention control and bouncermeasures (SPCC) plans the above-ground exploration, drilling, production and abandonment. Local SFCC plans for Mobile River Delta, Mobile Bay, wississippl Sound and Gulf of wexiew, Coordination of accident response team. State emergency response and compensation	Multi-company cooperative for suit Coast. Measures to retain well control. Gulf of Measer Marine Industry Research Group, Spill cleamup contractors. Specified facilities operation and emergency shutdown, orocedures. Containment booms at end of canal. Response and clean up unit is located in Bayou. A Barre, Alabama.	Full-brale accident response center at Mobile and periaps other locations. Multi-company cooperative(s) for the project area. Burial of pipelines of to b feet below sediment-water interface in open waters. Containment booms around barges when wastes are being transferred. Frequent pipeline inspection to detect damage and leaks augmented by automatic detection
10-16	unds. Designation of lead agency for actions response. Regulation of well control. Separate emergency action plans developed by companies. Designate preferred accident response techniques.		devices.

MITIGATING MEASURES RELEVANT TO OIL AND GAS DEVELOPMENT IN COASTAL ALLBAHA AND MISÁISSTPPI

CATEGORY	REGULATORY REQUIREMENTS	INDUSTRY PRACTICES	OTHER POTENTIAL MIFIGATION MEASURES
Accident altuations	Feur's Regulations and Policy Relevant to Acct. 9 on UCS: Operators on UCS required to subsit oil spil contingency plans. EPA and U.S. Coast Guard are enforcing agencies for spill containment and clean up and coordination of Regional Response Teams and on scene coordinators for regional cleanups. Pollution compensation—States can be relabilised for reasonable cleanup costs by federal government.	Operators are members of Clean Gult Associates. Response and clean up unit is located in Bayou La Batre, Alabama.	
Public Revenues	State Policy or Regulations: Operators must file a bond against the event of accidents to the state oil and gas board prior to drilling activities.		Compensation funds similar to tedetal plans could be established at state levels to offset potential economic losses to commercial fishing and tourism sectors in the event of au accident. Funds from hydrocarbon taxation could be the principal source of revenues.
Commercial Fishing	Compensation for commercial fisherman depending on circumstances of accident.		
Recreation/Tourism	Emergency Action Plans, including evacuation procedures must be submitted by operators for wells or plants producing resources with hydrogen sulfide gas. This would include tourist populations during peak seasons.		
NAVIGATION	Federally established safety fairways and designated anchorage areas; required adds to mavigation (markers, lights, fog signals) for rige, wellhead, platforms, pipe laying; publicaton in local motire to mariners of new rig or structure locations (includes type of aids to may agation).	Use of chase boat with geophysical surveys; tryw changes scheduled for min-week to avoid heavier weekend trailic.	

TABLE 10-1 (Contlaued)

MITTUATING MEASURES RELEVANT TO OIL AND GAS DEVELOPMENT IN COASTAL ALABAMA AND MISSISSIPPI

		SAULTED BO DE PRESENTE	OTHER POTENTIAL HILLOALION MEASURES
CATEGORY	REGULATORY REQUIREMENTS	INDUSTRY PRACTICES	
SOCIOECONOMIC CONCERNS			
Coutine operations			
Effects from 165	Federal Regulations and Policy: To prevent or mitigate effects from OCS development, planning grants and credit assistance can be granted under the Coastal Zone Management Act.		
Transportation of hydrocarbon regources from OCS	Intergovernmental Planning Program coordinates federal and state transportation (i.e., pipeline) needs and concerns.		
Recreation/Tourism	State Policy or Regulations to Reserve Coastal Resources: Protection of public coastal access. Protectjon of water recreation resources. Protection of natural scenic quality.	Offshore platforms enhance recreational fishing.	
Land Use	Special Management Areas designated for planning purposes. Energy facility siting procedures to resolve potential coastal land use conflicts. Hearings required when processing plant is proposed.		
Employment promitally leading to mongration		Inmigration could be reduced by expanding industry practice of hiring locals when possible.	In the event of inmigration from .maployment opportunities, state revenues from severance taxes and royalities could be allocated specifically to community improvements in potentially affected areas.

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TABLE 10-1 (Continued)

MITIGATING MEASURES RELEVANT TO OIG AGO GAS DEVELOPMENT IN CASTAL ALFAMA AND MISSISSIPPI

CATEGRAY	HEG: LATONY REQUIREMENTS	INDUSTRY PRACTICES	OTHER POTENTIAL MITIGATION MASSURES
SOLID WASTE DISPOSAL			
Geophysical explorition	Shot holes and other core holes below treshwater strata must be plugged.	Use of thumper frucks on uplands would reduce the use of shot holes	Use of aquatic exploration wherever posable.
<pre>lant learing for serial operations processing and service facilities</pre>	All potentially hazardous debris and vegetation must be out of well, tank and pump station vicinity. Approved offsite disposal of such waste is available. Open burning of solid wastes is prohibited.	Use of existing waterways in wetlands when possible.	Timber may be sold versus disposai offsite.
Drilling mads, cement, cuttings, sand, and other solid wastes generated by exploration, production, and workover	Zero discharge rules prohibit release of wastes from well sites into water; they must be collected, treated and ulsposed of in approved onshore facilities. All production facilities must be maintained to prevent pollution. Solid waste facilities aust meet design and siting criteria, obtain construction and operations permits, follow monitoring and testing procedures. New drilling wastes are tested prior to disposal permitting.	Wastes containing marketable material materials are treated for material reclamation and reuse.	Receptacle specifications could be mandated for waste barges, reducing risks of spills or leaks. Alternative procedures for drilling waste disposal could be used more widely i.e., landfarming dewatering procedures or incorporating the material into soils as conditioners. A licensing or manifest system for transport of wastes from the drilling site to an approved disposai site could be developed.
Mastes from abandonment	Abandonment procedures specify plugging and severing casing and pilings thus eliminating solid waste at the drill site.	Economics encourages recovery and reuse of materials, vessels and equipment. Unussble materials are sold in place to salvage dealers.	
Waste and by-products from processing and treatment facilities	Federal Resource Conservation and Recovery Act, if applicable, and state solid waste management regulations.	industry encourages efficient operation of recovery collection and processing facilities.	If some potentially hazardous wastes are generated in sufficient quantity, they might be considered hazardous; if storage, transport and disposal requirements established under RCAA were used when handling these wastes, the quality of the environment and public safety could be better insured.

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TABLE 10-1 (Continued)

MITIGATING MEASURES RELEVANT TO OIL AND GAS DEVELOPMENT IN COASTAL ALABAMA AND MISSISSIPPI

CATEGORY	REGULATORY REQUIREMENTS	INDUSTRY PRACTICES	OTHER POTENTIAL MITIGATION MEASURES
Pipeline altes	Noise Control Act of 1972 AL Marine Police Regulations	Use of marine mufilers and euclosures; probably no nighttime construction,	Improved noise insulating marerials and below-deck engine hoise control.
Service bases/refineries	Noise control Act of 1972 AL Marine Police Regulations AL Noise Control Laws USEPA noise recommendations OSHA regulations Posible city ordinances	Use of mufflers and enclosures; probably no (or reduced) night- time activity.	improved noise insulating materials.
Normal operation drilling riga	Noise Control Act of 1972 AL Marine Police Regulations individual oil and gas leased tract contractual specifics USEPA noise recommendations OSHA regulations Possible city regulations	Use of mufflers and enclosures (e.g., rig noise abstement); use or electric cranes and heat exchange engines; recycling of pressurized gas from treatment plant for enhanced recovery (as opposed to on-site pumps).	Improved noise insulating materials; possible seatheric shielding near onshore side of drilling rig or the receptor side(s) of land rig.
Pipelines	Noise Control Act of 1972 AL Noise Control laws AL Marine Police Regulations USEPA noise recommendations Possible city ordinances	Use of mufflers, enclosures and possibly silencers; reduced number of compressor stations (offshore)	Improved notse insulsting materials and silencers.
Service bases	Noise Control Act of 1972 AL Marine Police Regulations AL Noise Control Laws USEPA noise recommendations OSHA regulations Possible city ordinances	Use of sufflers and enclosures; probably reduced activity during nightime.	Improved noise insulating materials.
Ges plants partial processing	Noise Control Act of 1972 AL Noise Control Laws USEPA noise recommendations OSHA regulations Possible city ordinances	Multiport injector systems, mufflers enclosures, baffles, and absorbers.	Improved control technology, ose or greater use of vegetation to buffer noise.

TABLE 10-1 (Continued)

MITIGATING MEASURES RELEVANT TO OIL AND GAS DEVELOPMENT IN COASTAL ALABAMA AND MISSISSIPPI

CATECORY	REGULATORY REQUIREMENTS	LIDUSTRY PRACTICES	OTHER POTENTIAL MILLAT! 1 HEAT P.
011 and gas vapors	New source performance standards, 40 CFR 60 Part K and Ka Storage of Liquids-Oil and Gas	Limited storage at sea; pipeline to shore	Recovery caps on venting storage (see
Construction debris	Local "litter" laws; waste disposal limitations; city and county ordinances, permitting required for destruction or removal	Burning debris under peræit; enhanced burning techniques through blowers	Bury in landiils, possibly confers at sea under permit
Transportation	FAA and Federal Highway Administra- tive procedures; vehicular emissions, 40 CFR 86.081, 40 CFR 85.075-9 through 27, 40 CFR 86.1301-84 sub- part N	Catalytic converters; filters; operate in daytime if possible	furfifed ruel (notices), femova, coaditives; microprocessor controlled tuel flow, more efficient combustion
Peak oil and gas construction activity	Activities usually permitted under Federal and state laws	Limit to needs and economic demands	Delay of space at a more feats trate.
Accidential release of poliutants	Mississippi State Oil and Gas Board, Rules of Procedure and Statewide Rules, 1982; Alabama State Oil and Gas Board, 1983; procedural recommendations or various Canadian studies	File emergency plan and procedures; requires protocol listing of who and how notified; evacuation procedures; warnings and alerrs; liaison with fire, police, health authorities and methodology for accomplishing same; use warning and detection systems	Provide semi- or impletely successed monitoring and warning system over at a in use; use disl-ur technology, to a soft participating safet, persons, as agencies; chemically combine will with inerting gas
NOISE			
Drilling sites	Noise Control Act of 1972 AL Marine Police Regulations AL Noise Control Laws Individual All and gas leased tract contractural specifics. USEPA recommendations: Lqn = 55 to 65 dBA (residential) Leq(24) = 70 dBA (industrial) Possible city ordinances.	Use of mufflers and enclosures; restriction of some equipment use to daylight house; westble use of electric cranes.	Improved noise insulating manning s

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TABLE 10-1 (Continued)

MITIGATING MEASURES RELEVANT TO OIL AND GAS DEVELOPMENT IN COASTAL ALABAMA. ANY MINSTASSIERS

CATECORY	REGULATORY REQUIREMENTS	INDUSTRY PRACTICES	Oliga rolls and the second second
AIR QUALITY			
Source emissions	40 CRF 61 Appendix A-Testing; new source performance standards, 40 CFE 60; requires best available control technology (BACT); AZROS, NEDS, SOTDAT, EHIS, WSAP, PREMOD (all pert of EPA's information retrieval system). Jamary 20, 1984 propused Federal regulations would limit volatile organic compounds leaks from ourshery gas processing plants; same proposed regulations would put sulfur dloxide emissions limits gas processing facility and require "best demonstrated technology" to be employed	Design equipment scurces to minimize emissions; design to leust available emission rate	Flace precipitations, acrubhers buy bouses, Ellers of other conventions usefices in amo of source process o process to remove additional entra turb
- Ambient air quality O standards	Ambient air quality standards, 40 CPR 50, state air quality standards Alabama (Alabama Law-Act 769 H.702), Hissiasippi, Plorida state implementation plans, 40 CPR 51, citizen's suits allowable, 40 CPR 54, state air quality designations, 40 CPR 81	Required to model to predict compliance or degree of same (40 CPR 52.21)	Purther reduce by added estimation controls as stated above
FSD increments	PSD regulations, 40 CPR 51.24 and 52.21 June 1978; visibility, 40 CPR 51 Part P 51.302; non-compliance penalties, 40 CPR 67	Required to model or monitor to demonstrate compliance (40 CPE 52.21, 40 CPE 51)	Reduce entailors below PSD -tresholds; monfor to about the manimis
Attainment/non-attainment amblent standards	Attainment, 40 CFR Appendix S; delayed compliance orders, 40 CFR 65-66	Required to demnastrate attain- ment by 2 years of ambient data or 1 year and supportive workeling	Reduce emissions by closing down peripheral sources not part of 15ts operation
Construction and operation practice			
Fugitive dust	Indirect sources, 40 CFR 52.22 (b)	Water sprays; fogging of dust producing sources or roads	Use of surfactants, calcium coloutoe on reads and storage piles

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TABLE 10-1 (Continued)

MITIGATING MEASURES RELEVANT TO OIL AND GAS DEVELOPMENT IN COASTAL ALABAMA AND MISSISSIPPI

CATEGORY	REGULATORY REQUIREMENTS	INDUSTRY PRACTICES	OTHER POTENTIAL MILLOATI . MEASSEE
blowouts or casing ruptures	General rules: AL Rule 400-1-304 and 400-3-x02, MS Rule 63 and 13.	Installation of multiple blowout preventers; use of warning devices such as kick indicators.	Use of stronger alloys to tastum to include corrosion or tup are.
Spills	Federal Clean Water Act; containment of leaks or dikes: MS Rule 61	Collection of leakage or spills by curbing or dikes; zero discharge procedures; monitoring pipelines for corrosion.	Use of corrosion resistant analysistificates in pipes and the errequipment.
Inflitration from earthern pits	Regulations for pit usage and construction to prevent groundwater contamination: AL Rule 400-1-503, MS Rule 63.	Use of collection tanks rather than pits for most applications in project area.	Use of spray application of liners to reduce construction time and eliminate seams; Require liners for all pits.
laproper well plugging	Procedures stipulated to ensure pro- tection of groundwater resources: AL Rule 400-1-305, MS Rules 28 and 29. Plugging witnessed by state inspectors.	Regulated well plugging procedures.	
Contestnation through fractures	General Federal and state rules for the projection of groundwater; specific requirements for fracturing to protect formations and aquifers: AL Rule 400-1-3-,14.	Geologic surveys to assess frac- ture/fault zones; computer assisted fracturing operations to predict results and control operations.	Using polymeric compounds to siding the control of fracturing.
Underground injection	General regulations and standards of Federal UIC Program to protect underground sources of drinking water; specific rules governing injection well construction, injection procedures, well construction, injection procedures, designation procedures, designation procedures, designation injection strata; periodic state inspections of injection well mechanical integrity: AL Rule 400-1-5-04, MS Rules 45 and 63.	Comply with existing regulations and requirements.	Use better measuring and evaluating techniques to determine formation characteristics; monitoring of aquifers to detect early stages of pollution; use of polymeric compounds to decrease volume of produced water.

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TABLE 10-1 (Continued)

HITICATING MEASURES RELEVANT TO OIL AND GAS DEVELOPMENT IN COASTAL ALABAMA AND MISSISSIPPI

A GOLDAN	RECULATIONY REQUIREMENTS	INDUSTRY PRACTICES	OTHER POTENTIAL MITIGATION MEASURES
WITLAND ECOSYSTEMS	Environmental review of permit applications by federal and state agencies. No pollutant discharge requirement. Spill contingency plans. Restoration of catals, slips and pipeline right-of-way.	Directional drilling to reduce drilling sites needed.	In the Mobile Delta, reduce wetland area affected by using alternatives to the canal and slip diffing method, narrow pipeline corridors and joint wortures and trunklining to reduce number of pipelines required. De directional diffing to reach areas under saltmarshes to the extent practical. In Mobile Bay and Missisaippi Sound avoid pipeline landfalls that cross wetlands; use narrow pipeline corridors; reduce the number of pipelines coming onshore by using joint ventures and trunklining.
UPLAND ECOSTSTEME	Local zoning and land use stipulations. Requirement to consider prime farm- land.	Erosion prevention practices. Restoration of drilling, well and treatment facility sites after abandonment.	Joint ventures to reduce area required for pipelines and treatment facilities.
THREATENED AND ENDANCERED SPECIES	Requirement to consider effects of activities. Agency coordination with Federal Office of Endangered Species.	Site surveys for presence of endan- gered species.	Alter project plans to avoid effects on endangered species. Increase spill prevention and control activities.
COFFERCIAL PISHERIES	Use of air gun rather than dynamite for geophysical exploration; required aids to navigation (see navigation category) on new structives.	When possible, establish boat schedules to avoid fishing feet traffic.	No operations in oyster reef sress; avoid grass beds; establish pipeline corridors to minimize fisheries impacts.
CROUMDWATER Loss of formation waters or bydrocarbons to aquifers	Alabama casing/camenting requirements: Rules 400-1-303, 400-3-x02; prevention of intereirate movement: Rule 400-1-304; Mississippl casing/ camenting requirements: Rules 11, 12 and 0%-4; prevention of intereirsts movement: Rule 10.	Installation of casings and cement.	Use of stronger alloys for casings to inhibit correstor or trupture; use of inert. The casing use of electric logs to more closely delinable freshwater strats to establish casing requirements.

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TABLE 10-1

MITIGATING MEASURES RELEVANT TO OIL. AND GAS DEVELOPMENT IN COASTAL ALABAMA AND MISSISSIPPI

CATEGORY	REGULATORY REQUIREMENTS	INDUSTRY PRACTICES	SEGISTANTIA TATENSTED MEASURE
WATER QUALITY	Surveys prior to construction a. (vities. 404(b) permitting process for ali "res of dredge fill activities with possible expansion. Zero discharge rules. Preferred methods to obtain site access. Preferred spoil management techniques. Periodic monitoring of industry practices. Recommend or require particular dredging and pipe- laying techniques. Site restoration requirements. Avoid certain activities at certain times of the year. Super- vise canal dredging and other dredging activities. Require "buffer zone" between dredging activity and envi- ronmentally sensitive area. Intensify enforcement of permit requirements. Designate certain erea(s) as parks or wildlife refuge(s).	Spoil bank development with environmental considerations. Silation curtains. Coordination with Fish and Wildlife Service field scientists.	Prohibit hydrocarbon-related surface activities at particular locations, based on future research. More extensive use of site monitoring. Innovative surface water runoff control. Utilization of new dredging methods including spoil release and seasonality. Investigate the possibility that dredged material banks with no gaps may be prefered. Minimize wetland disturbance, particularly from October through March. Use of treatle roads to gain site access.
AQUATIC ECOSYSTEMS	Environmental review of permit applications by federal and state agencies and the public. No pollutant discharge requirement. Spill contingency plans.	Use of floating oil spill booms acris canals at all times in the Delta. Use of sheet pile around 3 mides of drilling barges in Mobile Bay or Mississippi Sound to reduce area affected, help contain small spills and reduce pad Acour. Directional drilling to reduce drilling mites needed.	In the Mobile Delta, reduce or eliminate turbidity by using boring methods for channel crossings, silt curtains when dredging, and directional drilling or other drilling alternatives to reduce dredging requirements. In Mobile 389, Mississippl Sound and the Gulf of Mexico allow no dredging for well site access; establish buffer zones around seagrass beds and oyster reefs in Alabama waters; plan pipeline routes to avoid areas of particular value such as seagrasses and oyster reefs; replant seagrasses or treatablish oyter reefs if disturbed; utilize joint ventures and trunklining to reduce number of pipelines required. Station spill response equipment in the region; store more spill containment equipment at each well location. Acquisition of lands for preservation.

American retroleum Institute (API), such as the API Recommended Francices for Safe Drilling of Walls containing Hydrogen Sulfide and API Specification for Materials and Testing of Well Cements.

OTHER POTENTIAL MITIGATING PRACTICES

4.4 There are many other mitigating practices and measures that could be utilized to reduce or eliminate environmental effects resulting from oil or gas resource development activities. Mention of a mitigating measure in the following table does not mean that all or any of the listed items would be necessary, required, or feasible under all situations.

CHAPTER 4

MITIGATING MEASURES

IN TRODUCTION

- 4.1 The postulated levels of hydrocarbon development in coastal Alabama and Mississippi would have a variety of environmental effects as detailed in Chapters 4 through 8 of the GEIS. In the case of many of the undesirable effects, the degree or severity depends in large measure on what concurrent actions are taken to minimize or offset the adverse effects. A variety of possible mitigating measures are available for the different phases of hydrocarbon development. These are given in Chapter 10 of the GEIS. Table 10-1 at the end of this chapter lists the various mitigating measures under the three broad categories:
 - o Regulatory requirements
 - o Industry practice
 - o Other potential mitigation practices

Under these categories, mitigating measures are listed for the various subcategories of the physical, biological or socienconomic environment that would be potentially affected by development activities.

REGULATORY REQUIREMENTS

4.2 This category includes those measures required by federal, state and local laws and regulations pertaining to hydrocarbon development specifically or to related activities in a particular environment. For example, the state oil and gas boards have specific bore hole casing requirements to protect groundwater resources.

INDUSTRY PRACTICE

In this category are various practices which the oil and gas indestry generally follow in the various phases of development of oil and gas resources. For example, companies employ a variety or practices and equipment to maintain safe operating conditions when offiling into formations with high hydrogen sulfide concentrations. One set of industry practices are not summarized in this chapter but are included in the bibliography. These are the various Recommended Practices and the Specifications published by the

TABLE 2-21 (Concluded)

SUMMARY OF ENVIRONMENTAL EFFECTS OF ACTIVITIES ANALYZED ON A REGION-WIDE BASIS FOR THE RESOURCE DEVELOPMENT SCENARIOS

PARAMATER

EFFECT

Socioeconomic Characteristics At a maximum as many as 24,000 laborers could be needed in year 8 for all simultaneous activities occurring in the Mobile Delta, Bay, Eastern Sound, Alabama Gulf waters and the adjacent Federal MCS. Excluding the Federal OCS, about 7,000 workers could be needed; only 3,000 positions would have the opportunity for local participation. The remainder would be associated with activities offering little, if any possibility for local involvement. Only in the highly unlikely case under the high scenario, where all employment needs are required from populations in Mobile and Jackson Counties and the surrourding community radius would immigration be likely. The EIAM indicates that in years 7 and 8 some immigration could occur. Under a more likely case under the high scenario, however, no in-migration is likely to result. Land use needs for projected hydrocarbon activity could be accommodated. Revenues from severance taxes and royalties could boost area coffers, particularly in Alabama, where revenues of as much as \$20 billion over the next 30 years could be collected.

CLAPTER 12

INTERAGENCY PERSPECTIVE AND RECOMMENDATIONS

INTRODUCTION

- 13.1 The objectives of the preceding chapters of this generic environmental impact statement (GEIS) were to:
 - Define a given study area and describe the physical, ecological, social, and economic conditions of the area in quantitative and, when data were unavailable, qualitative terms.
 - o Estimate the potential hydrocarbon resources of the study area to the extent possible based on existing data.
 - o Identify and evaluate the reasonable unit actions available to industry to explore for and produce hydrocarbon resources.
 - o Develop reasonable scenarios of the most likely range of hydrocarbon activities that might occur during the next 30 years.
 - o Evaluate and display the environmental impacts to the given study area based on the scenarios.
- 13.2 During the scoping process of this GEIS it became evident that some general assumptions were needed to manage the alternatives that could be subject to evaluation. These assumptions were established at the beginning of the GEIS process and continued throughout. The adoption of these assumptions does not preclude future evaluation of activities that would violate the assumptions; rather, it means that the singular and accumulative impacts and subsequent conclusions and recommendations could be invalid and a separate environmental evaluation, based on the revised assumation, would be required prior to decision on a permit application containing an exception to the assumptions in this GEIS.
- 13.3 The major environmental impact limiting assumptions for this GETS are:
 - o No discharge of cuttings, irrilling fluids, formation waters, contaminated wistewaters or contaminated rainwater runoff into area vaters.

- o All pipeline trenches will be backfilled.
- o All canals and slips for use of an Inland drilling barge will be restored to pre-project contours upon abandonment.
- All access channels will be backfilled upon abandonment.
- o All regulations will be followed.
- o Scenarios are based on minimizing the number of surface structures (multiple drilling from platforms to maximum extent), and some joint ventures will be used for pipelines.
- 13.4 An important purpose of this GEIS is to expedite the permitting process for hydrocarbon activities within the piven study area while protecting natural and man-made resources. As a guide for the permitting process, an interagency perspective and subsequent recommendations, drawn from the preceding chapters, are presented in this chapter.

PERSPECTIVE

Potentially Significant Impacts

- 13.5 Based upon the analysis of the impacts associated with the various activities involved in the exploration, development and production of hydrocarbons in the study area, the following potentially significant adverse impacts for the entire study area have been identified. Any activity associated with hydrocarbon operations that results in an impact upon the following environmental or socioeconomic factors is considered potentially significant.
 - a. Loss of natural resources.
 - 1. Wetlands.
 - 2. Submerged aquatic grassbeds or macroscopic algal communities.
 - Normally living oyster reefs and other live bottoms.
 - 4. Exposed hard bottoms.

- 5. Bird rookeries and populations.
- b. Restriction of fishing activities.
 - 1. Trawling and seining.
- c. Degradation of air quality.
 - Exceed allowable air quality degradation increment near urban/industrial areas.
 - Exceed short-term ambient air quality , tandards near gas processing facilities.
 - Hydrogen sulfide or other toxic gas release for more than a short time.
- d. Degradation of groundwater quality.
 - 1. Pollution of aquifers due to leaching of pollutants from unlined ponds or lagoons.
 - 2. Accidental contamination of potable aquifers via the well bore including disposal wells.
- e. Degradation of viewshed.
 - Location of platforms and rigs which can be readily seen from high use beaches.
- f. Accidents.
 - The loss of well control or pipeline failure that would result in the release of oil, H₂S or other type gas to the environment is identified as being of great concern due to the potential adverse impacts that such an accident would have upon living resources, water quality, human life, health, and property.

Minor Impacts and Concerns

13.6 Although the following items were not demonstrated in the GEIS to qualify as potentially significant impacts, they are items of concern or items that could result in minor impacts and should be considered as permit applications are being evaluated and the hydrocarbon industry is developing in the study area. Included in this minor impacts category are:

- '. Increase: turbidity from various oil and pas activities.
- 2. Air emissions from flates, crew boats, generators (burning refuse in delta, marsh situation).
- 3. Indivertent impacts to cultural resources and endangered species habitat.
- Alterations in surface drainage patterns and circulation which could result in modifications in sediment transport.
- Competition between hydrocarbon interests, and commercial and recreational waterway and facility users.
- Increased demand on berthing and service facilities for support vessels.
- 7. Local impacts associated with construction of new support facilities.
- 8. Local impacts to secondary road system due to increased vehicular traffic for land-based or land-accessed rigs and construction activities (concrete trucks, 18-wheelers, sand blasting carriers, etc.).
- 9. Local impacts due to increased demand on public facilities such as sewage treatment plants, potable water systems, fire protection, waste disposal operations, etc.
- 10. Changes in salinity regimes in the Mobile Delta due to trenching, channelization and circulation restrictions such as dikes, levees, and roadways.
- 11. River and canal bank erosion due to damaging wakes from crew boats servicing rigs.
- 12. Public perception of potential public health hazards due to transportation and disposal of drilling wastes in upland sites.
- Disturbances to bottom communities during transportation and emplacement/displacement of submersible rigs.

14. Disturbances to sensitive wetlands during pipeline construction, roadway construction, and other activities under the provisions of the Nationwide permit or outside the jurisdiction authority of the regulatory agencies, yet close enough to sensitive jurisdictional area to create synergistic impacts.

RECOMMENDATIONS

Permits

- 13.6a The Generic EIS serves as support information for the Mobile District Corps of Engineers regulatory program. There are two categories of permitting under this program including general and individual permits. As specified in the rules of the Corps of Engineers regulatory program published in the Federal kegister July 22 1982, there are two types of general permits referred to as nationwide and regional permits.
- 13.6b A nationwide permit is a form of general permit which authorizes a catagory of activities throughout the nation. Nationwide permits are designed to allow work to occur with little, if any, delay or paperwork. However, the natiowide permits are valid only if the conditions applicable to the nationwide permit are met. There currently exists nationwide permits for discharge of dredged or fill materials in certain waters of the United States and certain specific activities. The permit listings are too lengthy to present herein but are contained in the July 22 1982 rules.
- 13.6c A regional permit is a form of a general permit also designed to reduce paperwork and processing time. Based upon appropriate environmental evaluations, regional permits may be issued by the District Engineer for specified activities and areas.
- If a proposed activity is not covered by a nationwide or regional general permit, it is not precluded but rather must be processed under an individual permit application. This type of permit action addresses site-specific activities proposed by a particular permit applicant.
- 13.6e Based upon analysis contained in the Generic EIS, the cooperating agencies have developed recommendations for the permitting program related to hydrocarbon exploration and development in the study area. These recommendations are detailed in the following paragraphs.

- 13.7 <u>Mosile Delta</u>. Due to the ecological sensitivity of the Mobile Delta and the lack of specific data to support a finding of no significant impacts, it is recommended that no general permit be considered for hydrocarbon activities in the Mobile Delta at this time, other than the nationwide general permit currently in effect. All other activities would continue to be processed under individual permit applications. Further studies are recommended for the Delta.
- 13.8 Mobile Bay, Mississippi Sound and Gulf Coastal Waters. An evaluation of data contained in this GEIS coupled with experience gained from drilling operations in the Mobile Bay and adjacent waters support the recommendation for a general permit to include specific activities in selected portions of the study area. Recommended plements of this general permit are as follows:

PROPOSED GENERAL PERMIT
FOR HYDROCARBON EXPLORATORY/APPRAISAL DRILLING ACTIVITIES
IN MOBILE BAY/MISSISSIPPI SOUND AND
ALABAMA/MISSISSIPPI OFFSHORE WATERS

Hydrocarbon exploratory and appraisal drilling activities may be conducted on the above referenced areas provided the following conditions are met.

Condition Number 1: All Applicable State and Federal Regulatory requirements are met.

Condition Number 2: No discharge of drilling muds, cuttings, fluids, production (formation) waters, contaminated deck drainage, or sanitary wastes.

Condition Number 3: No dredging associated with the activity except that necessary for drilling pad site preparation. The limits of dredging shall not exceed 3,500 cubic yards from an area of 75 feet by 250 feet and the dredged material shall be transported to an approved designated disposal site. Only clean oyster shell, clam shell, or coarse aggregate may be used for the drilling pad.

Condition Number 4:

- A. In Alabama, the drilling size must be beyond one mile from shorelines fronting the Gulf of Mexico and one-half mile from other shorelines.
- B. In Mississippi, the drilling site must be beyond one mile from any shoreline.
- C. In Alabama and Mississippi, the drilling site must be beyond one mile from producing oyster reefs as defined or specified by the affected State and one-fourth mile from any known community of submerged aquatic vegetation. For verifications see Condition Number 8.

Condition Number 5: Submittal of a project-specific State approved oil spill contingency plan and blowout prevention plan.

Condition Number 6: Provide adequate navigation markings required by the affected State and United States Coast Guard.

Condition Number 7: No drilling rig will be located within established safety fairways and a 500-foot buffer zone will be provided on either side of other Federally maintained navigation channels and a 500-foot buffer zone provide on either side of pipelines. (Note: All structures and anchors must be placed in compliance with 33 CFR 209.135, July 1, 1983).

Condition Number 8: Survey Requirements. Before an action can be considered as qualifying under the provisions of this General Permit, the applicant must complete environmental and cultural resources surveys and submit the surveys with the application for authorization under this General Permit to the District Engineer.

Environmental Survey Requirements Applicable to Mississippi Resources

As a necessary corollary to Condition Number 4, an environmental survey shall be conducted in Mississippi to determine if, at the community level, submerged seagrass beds and attached macro- scopic algae are within 1,300 feet of the perimeter of the area to be disturbed. This survey shall be required only in the following areas.

1. Passes between the barrier islands with the survey area extending 2 miles north of a line representing the shortest distance between adjacent islands.

(See the attached map which shows the southern boundary limit for required environmental survey work in passes cast of the Gulfport Ship Channel.)

- 2. A zone within 2 miles of the shoreline of Cat Island (a barrier island).
- 3. A zone within 2 miles of only the northern shoreline of the other barrier islands (Ship, Horn and Petit Bois).
- 4. A zone within 1.5 miles of the shoreline of Round Island.
- 5. A zone extending 2 miles south from the opening to the Point Aux Chenes Bay.

In Mississippi, also an environmental survey shall be conducted to determine if hard bottoms or oyster reefs are within 300 feet of the perimeter of any area to be disturbed. However, neither the 300 ft. nor the 1,300 ft. environmental survey will be required in the state's territorial waters of the open Gulf which are located east of the Gulfport Ship Channel. These particular waters are located south of the barrier islands.

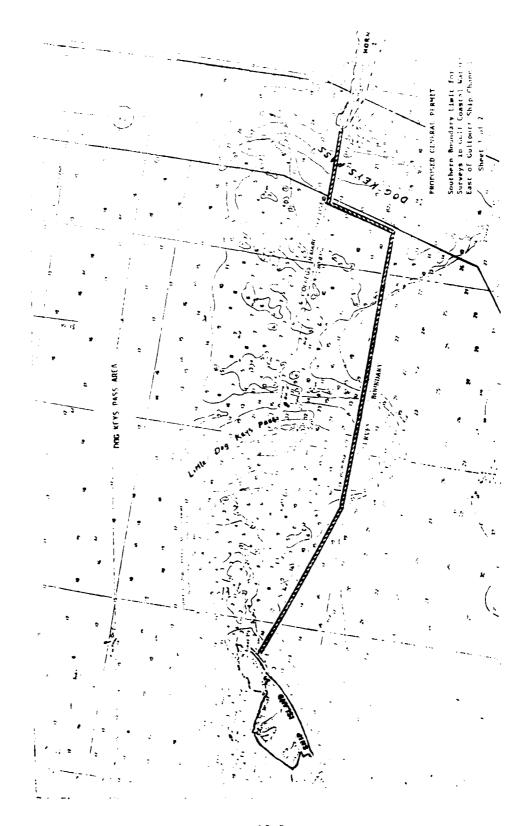
Environmental Survey Requirements Applicable to Alabama Resources

This environmental survey shall include the identification and location of oyster reefs, hard bottoms, submerged seagrass beds and attached macroscopic algal communities within a 300-foot radius of the area to be disturbed. No environmental survey would be required in the State's Gulf coastal waters.

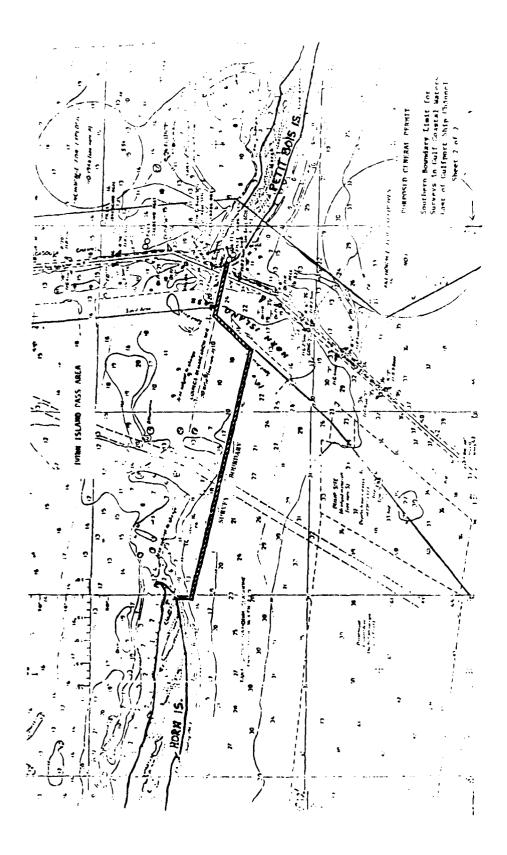
Cultural Resources Survey Applicable to Alabama and Mississippi

For cultural resources consideration, the survey shall be in accordance with the Mobile District, Corps of Engineers requirements.

Condition Number 9: The application for authorization under this General Permit, along with the required environmental or cultural resource surveys, will be subject to a ten-day agency review. The U.S. Army Corps of Engineers will consider agency comments in the permit decision.



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is.8a — Although sufficient information is represented for a regional control of the last provides an environmental analysis for a regional control of the term evaluation or specific permit actions a control of the control applications for the study area. This for a transfer of the study area individual permit applications for activities and created to overestly existing nationwide or recommended regional general permits.

Environmentally Preferred Alternatives

- 13.9 The GEIS discusses mitigation to lessen impacts from various alternative unit actions and scenarios. While recognizing that these alternatives exist, this section supplements those discussions by identifying least-damaging options recommended to industry.
- 3.10 The following environmentally preferred alternatives have been developed to encompass consideration of potentially significant impacts and activities preferred to be avoided. These alternatives would minimize to the extent practicable adverse environmental impacts. Although these conceptual alternatives may not be feasible in all cases for the geographic zones of reference, they serve as a focal point and basis of encouragement to industry in developing the most environmentally acceptable plans. These environmentally preferred alternatives for each geographic area are presented here.
- 13.11 <u>Delta</u>. Environmentally preferred techniques to minimize wetland and riverine disturbances are suggested as, but not limited, to:
 - a. Directional (slant) drilling not requiring any dredging in wetlands or minimized safety risks by location of drilling rig at a river bank slip.
 - b. Drill site access by air with inimal clearing of trees in immediate area of drill site.
 - c. Trestle road and portable land rig with operations base upland; or with an operations base on barges moored at a river location not requiring any wetland dredging.
 - d. Use of board road on natural grade without fill material placed in wetland.
 - e. Employ horizontal boring for pipeline installations through wetlands and through riverine environment.

- f. Sufficient alert and leak detection equipment on pipelines for drilling fluids, muds, liquid wastes and hydrocarbon products for duration of activities.
- g. Grew boat trips minimized and under reduce l speed and wake operation to minimize bank erosion.
- Rigs not located near bird rookeries to minimize noise disturbance.
- 3. Applicant participation in a rapid deployment spills response team on continuous call from a local operations base stockpiled with state-of-the-art spill containment equipment and clean-up materials to handle a major accident.
- 4. Restricted public access within one half mile of facilities to minimize danger from H2S accidents.
- 5. A waste management plan designed for secure handling of sludges, wastewaters and solid wastes during maximum flooding conditions. Plan should include tank containment of sludges and wastewaters on the rig platform and frequent conveyance to upland or to a waste barge moored at a river site via temporary above-grade pipeline.
- Testing of waste residuals (sludges) generated from drilling mud reprocessors/disposers for RCRA category.
- 13.12 Bay/Sound and Alabama/Mississippi Offshore Waters. The Recommended General Permit Criteria identified in this EIS constitute the preferred alternatives. In addition, the following elements would be included.
 - Employment of shallow draft rig and barge equipment to avoid dredging.
 - 2. Use of directional drilling, trestle road or air transport to access drill sites in marsh.
 - 3. Avoid pipeline landfalls where marsh or aquatic grassbeds are present.
 - Horizontal boring to install pipelines under sensitive areas.

- Attricient dert and leas reflection equipment on the ripalities and rigs and production radifit is.
- Minimize has bettere trenching by joint controls ripelines and installing multiple paper from a sugh corridor.
- Participation in a local rapid deploament of the restance team on continuous call and full to operational.
- Prempt tetilling of pipeline transfers throng preper bottom.
- Avois gas treatment plant or rig sitings near urban/ industrial or Class Lair quality seems.
- 10. Testing of waste residuals (sludges) generated from drilling mud reprocessors/disposers for #68A category.

Surveillance and Progressive Assessment

- 13.13 Increased hydrocarbon activities as a result of general and nationwide permitting in sensitive wetland and aquatic ecosystems of loastal Alabama and Mississippi pose the potential for some of the significant adverse effects which have been identified in the 4819. Also, other underlying potential impacts remain which have not been delineated as significant but are of general concern.
- 13.14 Mederal, State, and local authorities directly involved in regulating the hydrocarbon industry should consider the anticipated slope of hydrocarbor activities and the identified cumulative impacts which may result. This consideration could be accomplished by progressive assessments and consistent surveillance. Benefits derived would include:
 - a. An ongoing identification of actual impacts.
 - b. Improved permit compliance monitoring.
 - Opportunity to evaluate the construction and operations of ongoing hydrocarbon activities.
 - 4. Provide background to encourage industry to seek innovative technology.

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